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October 11, 1977 Volume 963 Number 2

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PATENT AND TRADEMARK OFFICE NOTICES

Documentation Presentation

A presentation on the "Technical Activities of the U.S. Patent and Trademark Office" will be given in cooperation with the Information Retrieval Committee of the American Patent Law Association. The presentation is to be held on October 19, 1977 from 9:30 A.M. until 4:00 P.M. at the Marriott Hotel at Dulles International Airport and is open to all members of the public. It is requested that anyone wishing to attend please contact Mr. P. James Terragno, Director, Office of Search Systems, U.S. Patent and Trademark Office, Washington, D.C. 20231, telephone (703)557-3049. Any inquiries concerning the presentation may be addressed to Mr. Terragno.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

Sept. 12, 1977.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,630,723, Re. S.N. 817,442, Filed July 20, 1977, Cl. 75/123, FREE CUTTING STEELS, Chiaki Asada, Owner of Record: *Daido Seiko Kabushiki Kaisha, Nagoya, Aicci Prefecture, Japan,* Attorney or Agent: Richard K. Stevens, et al., Ex. Gp.: 111

3,653,234, Re. S.N. 824,013, Filed Aug. 12, 1977, Cl. 68/12 R, CONTROL INJECTION SYSTEM FOR DRYCLEANING APPARATUS IN SYSTEMS, Robert A. Gillespie, Owner of Record: *Stauffer Chemical Company, New York, N.Y.,* Attorney or Agent: Ellen P. Trevors, et al., Ex. Gp.: 242

3,711,432, Re. S.N. 823,158, Filed Aug. 9, 1977, Cl. 260/16, LOW SHRINK POLYESTER RESIN SYSTEMS FORMED OF A MIXTURE OF UNSATURATED POLYESTER RESIN, MONOMERIC COPOLYMERIZABLE COMPONENT AND CELLULOSE ORGANIC ESTER, Navin Shah, Owner of Record: *W. R. Grace & Company, New York, N.Y.,* Attorney or Agent: William W. McDowell, Jr., et al., Ex. Gp.: 143

3,787,140, Re. S.N. 821,426, Filed Aug. 3, 1977, Cl. 415/80, POWER PLANT, Alvin L. Gregory, Owner of Record: *Inventor,* Attorney or Agent: Felix J. D'Ambrosio, et al., Ex. Gp.: 343

3,898,676, Re. S.N. 821,152, Filed Aug. 2, 1977, Cl. 354/25, DISTANCE DETECTING DEVICE, Kazuya Hosoe, et al., Owner of Record: *Canon Kabushiki Daisha, Tokyo, Japan,* Attorney or Agent: David Toren, et al., Ex. Gp.: 211

3,898,790, Re. S.N. 821,207, Filed Aug. 2, 1977, Cl. 58/23 BA, BATTERY-DRIVEN WATCH WITH BATTERY CONSUMPTION DISPLAY ALARM, Hirotoki Takamune, et al., Owner of Record: *Citizen Watch Company, Limited, Tokyo, Japan,* Attorney or Agent: John Clarke Holman, et al., Ex. Gp.: 217

3,900,712, Re. S.N. 825,540, Filed Aug. 15, 1977, Cl. 200/307, KEYBOARD SWITCH ARRANGEMENT, Satoshi Fukao, Owner of Record: *Brother Kogyo Kabushiki Kaisha, Mizuho-ku, Nagoya-shi, Japan,* Attorney or Agent: Alvin Browdy, et al., Ex. Gp.: 241

3,919,181, Re. S.N. 825,051, Filed Aug. 16, 1977, Cl. 260/80.78, PREPARATION OF HYDROCARBON RESINS USING ZIRCONIUM TETRACHLORIDE, Kenneth C. Petersen, et al., Owner of Record: *Schenectady Chemicals, Inc., Schenectady, N.Y.,* Attorney or Agent: John W. Malley, et al., Ex. Gp.: 144

3,960,770, Re. S.N. 825,321, Filed Aug. 17, 1977, Cl. 252/444, PROCESS FOR PREPARING MACROPOROUS OPEN-CELL CARBON FOAM FROM NORMALLY CRYSTALLINE VINYLIDENE CHLORIDE POLYMER, Charles F. Raley, Jr., et al., Owner of Record: *The Dow Chemical Company, Midland, Mich.,* Attorney or Agent: Richard G. Waterman, et al., Ex. Gp.: 115

3,963,140, Re. S.N. 825,190, Filed Aug. 16, 1977, Cl. 215/254, BOTTLE CAPS, Sune Harding, Owner of Record: *AB Wicanders Korkfabriker, Alvangen, Sweden,* Attorney or Agent: Granville M. Brumbaugh, et al., Ex. Gp.: 241

3,976,508, Re. S.N. 823,119, Filed Aug. 9, 1977, Cl. 136/89, TUBULAR SOLAR CELL DEVICES, Abraham I. Mlavsky, Owner of Record: *Mobil Tyco Solar Energy Corporation, Waltham, Mass.,* Attorney or Agent: Robert J. Schiller, et al., Ex. Gp.: 114

3,977,555, Re. S.N. 822,378, Filed Aug. 5, 1977, Cl. 215/247, PROTECTIVE SAFETY CAP FOR MEDICAMENT VIAL, Roger R. Larson, Owner of Record: *Pharmaco, Inc., Champaign, Ill.,* Attorney or Agent: Harvey B. Jacobson, et al., Ex. Gp.: 241

3,989,517, Re. S.N. 823,802, Filed Aug. 11, 1977, Cl. 75/175.5, TITANIUM-BERYLLIUM BASE AMORPHOUS ALLOYS, Lee E. Tanner, et al., Owner of Record: *Allied Chemical Corporation, New York, N.Y.,* Attorney or Agent: David W. Collins, et al., Ex. Gp.: 111

4,005,637, Re. S.N. 822,112, Filed Aug. 5, 1977, Cl. 91/276, HYDROACOUSTIC APPARATUS AND VALVING MECHANISMS FOR USE THEREIN, John V. Bouyoucos, et al., Owner of Record: *Hydroacoustics, Inc., Rochester, N.Y.,* Attorney or Agent: Martin Lu Kacher, Ex. Gp.: 341

4,008,717, Re. S.N. 825,391, Filed Aug. 17, 1977, Cl. 128/214 R, SYSTEM FOR CONTINUOUS WITHDRAWAL AND ANALYSIS OF BLOOD, Allen A. Kowarski, Owner of Record: *Johns Hopkins University, Baltimore, Md.,* Attorney or Agent: Edwin T. Yates, Ex. Gp.: 335

4,032,576, Re. S.N. 823,316, Filed Aug. 10, 1977, Cl. 260/586, 2-DECARBOXY-2-HYDROXY-METHYL-PGE, ANALOGS, Norman A. Nelson, Owner of Record: *The Upjohn Company, Kalamazoo, Mich.,* Attorney or Agent: Robert A. Armitage, et al., Ex. Gp.: 126

PATENT NOTICES

Certificates of Correction for the Week of Oct. 11, 1977

3,754,455	4,018,930	4,027,647	4,032,497
3,784,634	4,018,975	4,027,659	4,032,588
3,868,400	4,019,889	4,027,722	4,032,862
3,917,457	4,021,198	4,027,733	4,032,868
3,944,004	4,021,553	4,027,812	4,032,877
3,950,003	4,021,564	4,027,917	4,032,976
3,954,976	4,021,601	4,028,024	4,033,013
3,958,025	4,021,630	4,028,118	4,033,038
3,965,385	4,021,871	4,028,187	4,033,137
3,966,534	4,021,939	4,028,247	4,033,230
3,969,373	4,022,012	4,028,316	4,033,255
3,969,552	4,022,372	4,028,450	4,033,353
3,971,825	4,022,390	4,028,581	4,033,361
3,983,152	4,022,576	4,028,668	4,033,393
3,983,196	4,022,644	4,028,669	4,033,428
3,983,238	4,022,775	4,028,672	4,033,530
3,986,106	4,022,836	4,028,756	4,033,535
3,987,723	4,022,869	4,028,800	4,033,576
3,988,937	4,022,899	4,028,844	4,033,615
3,992,394	4,022,973	4,028,933	4,033,660
3,994,628	4,023,190	4,029,367	4,033,710
3,998,140	4,023,255	4,029,394	4,033,779
4,000,085	4,023,664	4,029,536	4,033,838
4,001,540	4,023,790	4,029,578	4,033,973
4,003,233	4,023,950	4,029,582	4,034,012
4,005,645	4,024,225	4,029,745	4,034,113
4,006,195	4,024,285	4,030,075	4,034,189
4,006,266	4,024,604	4,030,080	4,034,360
4,006,466	4,024,698	4,030,102	4,034,508
4,007,628	4,024,893	4,030,150	4,034,535
4,008,184	4,024,972	4,030,188	4,034,592
4,008,328	4,025,008	4,030,198	4,034,761
4,009,092	4,025,171	4,030,386	4,034,944
4,009,594	4,025,177	4,030,501	4,035,081
4,009,727	4,025,330	4,030,510	4,035,167
4,010,460	4,025,395	4,030,521	4,035,201
4,010,751	4,026,082	4,030,532	4,035,312
4,010,832	4,026,130	4,030,583	4,035,466
4,011,311	4,026,438	4,030,592	4,035,593
4,011,871	4,026,480	4,030,651	4,035,767
4,012,533	4,026,554	4,030,672	4,036,260
4,012,872	4,026,682	4,030,684	4,036,263
4,012,877	4,026,692	4,030,707	4,036,300
4,012,994	4,026,742	4,030,723	4,036,347
4,013,192	4,026,770	4,030,910	4,036,442
4,013,837	4,026,798	4,030,973	4,036,682
4,014,615	4,026,952	4,031,152	4,036,758
4,015,317	4,027,018	4,031,211	4,036,972
4,015,996	4,027,079	4,031,219	4,037,110
4,016,473	4,027,146	4,031,267	4,037,437
4,016,692	4,027,176	4,031,398	4,037,454
4,016,907	4,027,194	4,031,595	4,037,848
4,017,146	4,027,243	4,031,742	4,037,849
4,018,165	4,027,305	4,031,899	4,038,085
4,018,316	4,027,399	4,031,997	4,038,531
4,018,629	4,027,400	4,032,033	
4,018,801	4,027,589	4,032,391	

Disclaimers

3,902,965.—*Toshiro Furukawa* and *Hiroo Kaneyuki*, Yamaguchi, Japan. METHOD FOR PRODUCTION OF CITRIC ACID. Patent dated Sept. 2, 1975. Disclaimer filed Sept. 1, 1977, by the assignee, *Mitsui Petrochemical Industries.*

Hereby enters this disclaimer to claims 1, 2, 3, 4 and 11 of said patent.

3,932,713. *Albert C. Fleuchaus*, Wheeling, and *Paul Shylo*, Norridge, Ill. INDUCTION CANCELLATION CIRCUIT. Patent dated Jan. 13, 1976. Disclaimer filed Aug. 15, 1977, by the inventors and the assignee, *Cook Electric Company.*

Hereby enter this disclaimer to claim 7 of said patent.

3,949,213.—*Harold Paitchell*, Clifton, N.J. UNDERWATER LIGHT. Patent dated Apr. 6, 1976. Disclaimer filed Aug. 15, 1977, by the assignee, *Hayward Manufacturing Co., Inc.*

Hereby enters this disclaimer to claims 1 to 3, inclusive, and claims 8 to 10, inclusive, of said patent.

Patents Available for Licensing or Sale

D–243,952. CHILDS' COMPASS. William J. Bryant, 2251 Washington Ave., #A, San Leandrom Calif. 94577.

3,964,120. COMB CLEANER. Nevin R. Woodford, 1011 Arlington Blvd., Arlington, Va. 22209.

3,953,983. REFRIGERATION METHOD AND REFRIGERATION APPARATUS FOR CARRYING OUT THE METHOD. Ernst Sander. Correspondence to: Craig & Antonelli, 909 Watergate Office Bldg., 2600 Virginia Ave. NW., Washington, D.C. 20037.

3,946,144. SEALED CABLE JUNCTION. Wilhelm Quante Spezialmaschin-Enfabrik fur Apparate der Fernmeldetechnik. Correspondence to: Michael J. Striker, 360 Lexington Ave., New York, N.Y. 10017.

3,906,559. BLANKET AND SHEET. Agnes K. Bahr, 707 Whispering Pine Drive, Auburndale, Fla. 33823.

3,899,157. TACK FASTENER AND STRIPPER. Robert Thomas, 30 W. Chicago Ave., Chicago, Ill. 60610.

3,835,836. COMPRESSION OPHTHALMODYNAMOMETER. Yale C. Kanter and Bruce A. Nemer. Correspondence to: Wicks & Nemer, Suite 1407 800 Line Building, Minneapolis, Minn. 55402.

3,808,921. CUTTING MACHINE FOR CUTTING FLAT MATERIALS. Wilfried Baumann, Germany. Correspondence to: Striker, Striker & Stenby, 360 Lexington Ave., New York, N.Y. 10017.

3,601,327. APPARATUS FOR STORING AND FOR TRANSPORTING WEBS TO A CUTTING DEVICE. Wilfried Baumann, Germany. Correspondence to: Striker, Striker & Stenby, 360 Lexington Ave., New York, N.Y. 10017.

3,596,297. MODULAR FURNITURE. Herbert James Route 2, Box 166A, York, Ala. 36925.

3,330,287. MULTI-PRONG HAIRPIN. Eleanor J. Muhs, 1064 Winona Blvd., Rochester, N.Y. 14617.

3,325,958. PREASSEMBLED STRUCTURAL FRAMEWORK. Albert B. Moore, Albert B. Moore Associates, Inc., Wells Hill Road, Lakeville, Conn. 06039.

3,250,652. EXOTHERMIC COMPOSITION CONTAINING ZINC AND AMMONIUM CHLORIDE. John E. Claiborne, 814 Boagni St., Opelousas, La. 70570.

4,001,911. MANUALLY OPERATED ROTARY SEWER CLEANOUT DEVICE. Clyde W. Watson, 1916 SE., 6th Ave. Mineral Wells, Tex. 76067.

4,003,275. WRENCH. Mr. Rodney W. Smith, 83353 Spruce Lane, Florence, Oreg. 97439.

4,006,843. APPARATUS AND METHOD OF WATERING OBJECTS. Antonio Martinez Martinez, Avda. del Manzanares No. 148, Madrid, Spain, and Jose M. Saenz, 45 Tudor City Pl. (Apt. 1311), New York, N.Y. 10017.

4,010,949. TWO BILLIARD PRODUCTS. A. George Lee, 4103 Elmhurst, Royal Oak, Mich. 48073.

4,018,593. PROCESS FOR RECOVERING USEFUL SUBSTANCES FROM CULTURE MEDIA. Hans Muller, Switzerland. Correspondence to: Michael J. Striker, 360 Lexington Ave., New York, N.Y. 10017.

4,019,661. LIQUID DISPENSER FOR SELECTIVE UPSIDE DOWN OR RIGHT SIDE UP USE. Janos Szabo, 214 East 82nd St., New York, N.Y. 10028.

4,020,826. SOLAR ENERGY SYSTEM. Robert Alan Mole, 230 S. 39th St., Boulder, Colo. 80303.

4,021,965. FERTILIZER AND PESTICIDE DISPENSING TOMATOE STAKE. F. W. Norris, Horse Cove Road, Box 133E, Highlands, N.C. 28741.

4,032,099. RECLINER PLATFORM. James W. Maude, 52 Village St., Marblehead, Mass. 01945.

4,032,238. IMPROVED FOUNTAIN PAINT ROLLER. Ragnvald G. Leland, P.O. Box 4174, Palm Springs, Calif. 92262.

4,033,098. GRASS TRIMMING APPARATUS. Garry J. Green, Box 162, Corydon, Iowa 50060.

4,034,310. PHASE-LOCKED LOOP OSCILLATOR. Thomas F. Coe, 3173–39 Bancroft Drive, Spring Valley, Calif. 92077.

4,036,507. WHEELS AND ASSEMBLY FOR A BOAT. Eldon V. Henderson, Route #1, Box 204–H, West Sacramento, Calif. 95691.

4,037,581. SCREEN DEVICE FOR STOVE OVENS. Thomas Trifileti, Albany, N.Y. Correspondence to: Frederick L. Bergert, Crystal Square No. 5, 1755 Jefferson Davis Highway, Arlington, Va. 22202.

4,049,009. APPARATUS FOR TRIMMING THE NAILS. Florian Marchand. Correspondence to: Georges Marchand S. A. CH 2738 Court, BE Switzerland.

The following two patents are offered by John O. Richards, 980 Mill Circle Apt. #99, Alliance, Ohio 44601.

3,835,507. ROPE HOLDING DEVICE.

3,578,840. REVOLVING REFLECTOR.

The following two patents are offered by Mr. How Wachspress, Technical Director, Auditac, Ltd., 1940 Washington St., San Francisco, Calif. 94109.

3,875,932. AUDIOTACTILE STIMULATION AND COMMUNICATIONS SYSTEM.

3,954,101. AUDIOTACTILE COMMUNICATION SYSTEM.

General Electric Company is prepared to grant non-exclusive licenses under the following 6 patents upon reasonable terms to domestic manufacturers.

Applications for licenses may be addressed to: General Electric Company, 100 Woodlawn Ave., Pittsfield, Mass. 01201.

3,612,750. CABLE-CONNECTING ADAPTOR FOR HIGH VOLTAGE BUSHING OF A PAD-MOUNTED TRANSFORMER.

3,782,324. METER DIAL WITH MIRROR IMAGE PORTION.

3,792,404. CIRCUIT BREAKER HAVING MECHANICAL LOCK TO PREVENT AUTOMATIC OPERATION.

3,829,810. BUSHING, FUSE AND FUSEHOLDER.

4,009,417. ELECTRICAL APPARATUS WITH HEAT PIPE COOLING.

4,009,418. ATTACHMENT OF HEAT PIPES TO ELECTRICAL APPARATUS.

Applications for licenses may be addressed to the Patent Counsel, Mobile Radio Prods. Dept., General Electric Company, Lynchburg, Va. 24502.

4,020,421. MUTING CIRCUIT.

Application for license may be addressed to Division Patent Counsel, Switchgear & Distribution Transformer Division, General Electric Company, 6901 Elmwood Ave., Philadelphia, Pa. 19142.

4,024,486. OUTER LOCKING TURN FOR PRECUT CORE.

Application for license may be addressed to: General Electric Company, 2001 Jefferson Davis Highway, Arlington, Va. 22202.

3,996,081. METHOD FOR MAKING A HIGH VOLTAGE CABLE.

Application for license under the following patent should be addressed to: Patent Counsel, Drive Systems Department, General Electric Company, 1501 Roanoke Blvd., Salem, Va. 24153.

4,019,094. STATIC CONTROL SHORTING CLIP FOR SEMICONDUCTOR PACKAGE.

Applications for licenses should be addressed to: Division Patent Counsel, Space Division, General Electric Company, P.O. Box 8555, Philadelphia, Pa. 19101.

4,008,573. MOTIVE FLUIDS FOR EXTERNAL COMBUSTION ENGINES.

4,016,493. SIMPLIFIED LAND LINE AND SATELLITE COMMUNICATION SWITCHING SYSTEM.

4,016,494. SATELLITE COMMUNICATION SYSTEM WITH IMPROVED CONFERENCE FACILITY.

4,017,985. MULTISENSOR DIGITAL IMAGE GENERATOR.

4,025,248. RADIALLY EXTENDED VAPOR INLET FOR A ROTARY MULTIVANED EXPANDER.

Applications for licenses may be addressed to Patent Counsel, Turbine Operations, Turbine Patent Operation, General Electric Company, 1 River Road, Building 18A, 5th Floor, Schenectady, N.Y. 12345.

3,427,880. OVERHEATING DETECTOR FOR GAS COOLED ELECTRIC MACHINE.

3,536,591. MULTIPLE EFFECT DISTILLATION APPARATUS.

3,573,460. ION CHAMBER DETECTOR FOR SUBMICRON PARTICLES.

3,653,019. SIGNAL MONITORING SYSTEM.

3,665,234. GENERATOR END WINDING SUPPORT.

4,032,874. REACTOR CORE.

4,001,654. TESTABLE PROTECTIVE SYSTEM.

4,008,433. CAPACITANCE DISPLACEMENT TYPE MEASURING PROBE.

4,013,378. AXIAL FLOW TURBINE EXHAUST HOOD.

4,020,869. COMBINED STOP AND INTERCEPT VALVE FOR STEAM TURBINES.

4,022,424. SHAFT BEARING AND SEAL FOR BUTTERFLY VALVES.

Applications for licenses may be addressed to the General Electric Company, Division Patent Counsel, Housewares and Audio Business Division, 1285 Boston Ave., Bridgeport, Conn. 06602.

3,489,936. TOOTHBRUSH WITH MOTION SELECTOR BUTTON.

3,742,174. INDUCTION COOKING APPLIANCE INCLUDING COOKING VESSEL HAVING MEANS FOR TRANSMISSION OF TEMPERATURE DATA BY LIGHT PULSES.

3,742,178. INDUCTION COOKING APPLIANCE INCLUDING COOKING VESSEL HAVING MEANS FOR WIRELESS TRANSMISSION OF TEMPERATURE DATA.

3,745,290. INDUCTIVELY HEATABLE UTENSILS OR VESSELS FOR HEATING, SERVING AND STORING FOOD.

3,990,460. DRYING HAIR CURLER.

4,000,834. APPARATUS FOR HEATING AND DISPENSING FLOWABLE MATERIAL.

4,006,338. MICROWAVE HEATING APPARATUS WITH IMPROVED MULTIPLE COUPLERS AND SOLID STATE POWER SOURCES.

4,006,339. MICROWAVE HEATING APPARATUS WITH MULTIPLE COUPLING ELEMENTS AND MICROWAVE POWER SOURCES.

4,027,786. APPARATUS FOR HEATING DISPENSABLE FLOWABLE MATERIAL.

Applications for licenses may be addressed to: Patent Counsel, Motors & Drives Business Division, General Electric Co., 1285 Boston Ave., Building, 21EE, Bridgeport, Conn. 06602.

3,942,741. REEL CONSTRUCTION.

3,942,937. METHOD OF PROVIDING DURABLE, SLICK SLIDING SURFACES ON EXTRUSION FORMING APPARATUS, AND THE PRODUCT THEREOF.

3,957,719. METHOD OF HEAT TREATING AN ETHYLENE CONTAINING POLYMER ELECTRICAL INSULATING COMPOSITION AND PRODUCT FORMED THEREBY.

3,959,558. PRESSURELESS CURING SYSTEM FOR CHEMICALLY CROSS-LINKING ETHYLENE-CONTAINING POLYMERS AND PRODUCT FORMED THEREBY.

3,960,739. METHOD OF STABILIZING THE DIELECTRIC STRENGTH OF POLYOLEFIN POLYMERS, AND THE STABILIZED COMPOSITIONS AND PRODUCTS THEREOF.

3,962,531. ELECTRICAL CONDUCTOR INSULATED WITH FILLED POLYMERIC COMPOUNDS.

3,978,815. CONTINUOUS CASTING APPARATUS WITH AN ARTICULATIVE SEALING CONNECTION.

3,979,356. POLYMERIC COMPOSITION AND INSULATED PRODUCTS.

3,979,488. PROCESS OF CONTINUOUSLY BLENDING, MOLDING AND CURING HEAT CURABLE POLYMERIC COMPOUNDS.

3,981,653. APPARATUS FOR THE MANUFACTURE OF AN ELECTRICAL CONDUCTOR COVERED WITH A CROSSLINK CURED POLYMERIC INSULATION.

3,995,587. CONTINUOUS CASTING APPARATUS INCLUDING Mo-Ti-Zr ALLOY BUSHING.

3,997,494. COMPOUNDED THERMOPLASTIC POLYMERIC MATERIALS AND FILLERS.

Application for license may be addressed to the Group Patent Counsel, Major Appliance Business Group, General Electric Company, Appliance Park, Louisville, Ky. 40225.

3,229,379. CONTROL SYSTEM FOR FABRIC DRYER.

3,238,636. AUTOMATIC DRYER CONTROL SYSTEM.

3,290,587. DRYNESS SENSOR FOR AUTOMATIC FABRIC DRYING MACHINE.

3,362,082. AUTOMATIC DRYER CONTROL SYSTEM.

3,721,948. TERMINAL ASSEMBLY.

3,870,440. HERMETICALLY SEALED COMPRESSOR SUCTION TUBE ASSEMBLY.

3,885,580. DISHWASHER CONTROL SYSTEM.

3,896,641. COMBINATION LINT FILTER AND ADDITIVE DISPENSER FOR AUTOMATIC WASHER.

4,008,454. DIFFERENTIAL EXPANSION ROD AND TUBE THERMOSTAT.

4,009,795. COMBINED REFLECTOR PAN AND TRIM RING.

4,017,702. MICROWAVE OVEN INCLUDING APPARATUS FOR VARYING POWER LEVEL.

4,020,323. ENERGY SAVING BROILING OVEN.

4,021,642. OVEN EXHAUST SYSTEM FOR RANGE WITH SOLID COOKTOP.

4,025,427. REUSABLE WATER SOFTENER SYSTEM FOR CLOTHES WASHER.

4,028,012. SEALING MEANS FOR A DISHWASHER TUB AND MOTOR ASSEMBLY.

4,035,787. FOOD TEMPERATURE RESPONSIVE CONTROL APPARATUS.

IU Technology Corporation is prepared to grant non-exclusive licenses on reasonable terms and conditions under the following patents.

3,720,609. PROCESS FOR TREATING AQUEOUS CHEMICAL WASTE SLUDGES AND COMPOSITIONS PRODUCED THEREBY.

3,785,840. LIME-FLY ASH-SULFITE MIXTURES.

Inquiries respecting licenses under these and/or related patents may be addressed to B. Lawrence Seabrook, Jr., President, IU Technology Corporation, 3624 Market St., Philadelphia, Pa. 19104.

The following 7 patents are offered by: Mr. Richard P. Mergehenn, J. H. Filbert, Inc., 3701 Southwestern Blvd., Baltimore, Md. 21229.

3,534,792. ONION RING SEPARATOR. Gerald J. Orlowski.

3,537,494. SLICING MACHINE. Gerald J. Orlowski.

3,606,917. PEELING MACHINE. Gerald J. Orlowski.

3,678,976. ONION PEELING APPARATUS. Gerald J. Orlowski.

3,682,214. ONION RING SEPARATOR. Gerald J. Orlowski.

3,885,519. APPARATUS FOR BREADING FOOD OBJECTS. Gerald J. Orlowski.

3,941,538. APPARATUS FOR FORMING EDIBLE RINGS. Gerald J. Orlowski.

The Du Pont Company announces that non-exclusive licenses are available on reasonable terms under the following thirty-seven patents. Inquiries respecting licenses may be directed to:

Director, Patent Liaison & Research Services, Textile Fibers Department, E. I. du Pont de Nemours & Company, Wilmington, Del. 19898.

3,670,048. GRAFT COPOLYMERS OF UNSATURATED POLYETHERS ON POLYAMIDE AND POLYESTER SUBSTRATES.

3,565,780. PROCESS FOR THE PREPARATION OF GRAFT COPOLYMERS USING REPETITIVE IRRADIATION AND CONTACTING STEPS.

3,514,385. PROCESS FOR RADIATION GRAFTING ONTO A PARTIALLY SWOLLEN CELLULOSIC SUBSTRATE.

3,488,268. IRRADIATION PROCESS FOR PREPARING GRAFT COPOLYMERS.

3,424,820. GRAFT COPOLYMERS OF AMINE COMPOUNDS ON POLYAMIDE AND POLYESTER SUBSTRATES.

3,423,163. CELLULOSIC TEXTILE FIBERS BEARING GRAFTED N-METHYLOL AMIDE.

3,413,378. GRAFT COPOLYMERS OF NITRILE GROUPS ON POLYAMIDE SUBSTRATES.

3,412,176. GRAFT COPOLYMERS OF UNSATURATED ALCOHOL SIDE CHAINS ON POLYAMIDE OR POLYESTER SUBSTRATES.

3,412,175. GRAFT COPOLYMERS OF FLUOROCARBON GROUPS ON POLYAMIDE OR POLYESTER SUBSTRATES.

3,394,985. GRAFT POLYMERIZATION REACTION OF POLYAMIDE FILAMENTS AND ACRYLIC ACID PROMOTED BY HYDROGEN PEROXIDE - FORMALDEHYDE SULFOXYLATE SALT CATALYST COMBINATION.

3,338,985. GRAFT COPOLYMERS OF EPOXYETHYLENE GROUPS OF POLYAMIDE OR POLYESTER SUBSTRATES.

3,313,591. PROCESS OF GRAFT POLYMERIZING ETHYLENICALLY UNSATURATED MONOMERS TO SOLID, SHAPED POLYCARBONAMIDES EMPLOYING HEAT AS THE SOLE GRAFT INITIATOR.

3,297,471. ACRYLIC OR METHACRYLIC ACID GRAFTING COPOLYMERIZED ON NYLON AND FORMING SALT OF SAID GRAFT.

3,290,415. GRAFT COPOLYMER OF POLYMERIC HYDROCARBON AND ORGANIC ACID BEARING RADICAL.

3,290,207. FIBRILLATED FIBER.

3,286,025. RECORDING PROCESS USING AN ELECTRON BEAM TO POLYMERIZE A RECORD.

3,284,156. SYNTHETIC POLYAMIDE TEXTILE MATERIAL HAVING A POLYORGANOSILOXANE GRAFTED THERETO.

3,215,671. CROSSLINKED POLYOXYMETHYLENES AND THEIR PREPARATION.

3,188,229. PROCESS OF ADHERING AN ORGANIC COATING TO A SUBSTRATE.

3,188,228. METHOD OF GRAFT POLYMERIZING AN ORGANIC COMPOUND TO A SOLID SHAPED CONDENSATION POLYMER STRUCTURE.

3,188,165. PROCESS FOR GRAFTING AN ORGANIC COMPOUND TO A SHAPED ARTICLE OF AN ADDITION POLYMER.

3,170,892. GRAFT POLYMERS WITH POLYSULFONE GRAFTS AND THEIR PREPARATION.

3,128,528. PREPARATION OF HYDROSET TEXTILE MATERIAL.

3,111,424. PROCESS OF COATING IRRADIATED POLYMER SUBSTRATES.

3,101,276. PROCESS FOR GRAFTING POLYMERS TO CELLULOSE SUBSTRATES.

3,101,275. PROCESS OF COATING A SHAPED SWOLLEN POLYMER SUBSTRATE AND TREATING WITH IONIZING RADIATION.

3,099,631. NITROGENOUS CONDENSATION POLYMER CONTAINING GRAFTED ACID.

3,092,512. GRAFT COPOLYMER OF POLYMERIZABLE AMIDE AND NITROGENOUS CONDENSATION POLYMER, AND PROCESS FOR PREPARING SAME.

3,090,664. GRAFT POLYMERIZING AN UNSATURATED ORGANIC ACID OR SALT THEREOF ONTO A NITROGEN CONTAINING POLYMER SUBSTRATE.

3,088,791. GRAFT POLYMERIZATION OF A VINYL MONOMER TO A POLYMERIC SUBSTRATE BY LOW TEMPERATURE IRRADIATION.

3,079,312. SHAPED POLYMERIC ARTICLES.

3,076,843. FLUORINATED DERIVATIVES OF CARBOXYLIC ACID HYDRAZIDES.

3,068,122. SELECTED GRAFT POLYMERS AND THEIR PREPARATION.

3,065,157. PROCESS FOR MODIFYING POLYMERS AND PRODUCTS THUS OBTAINED.

2,999,772. COATED ARTICLE COMPRISING A SUBSTRATE OF POLYETHYLENE OR POLYAMIDE AND A GRAFTED COATING OF POLYTETRAFLUOROETHYLENE OR POLYMETHYL METHACRYLATE.

2,999,056. IRRADIATION BONDING OF ACIDIC COMPOUNDS TO SHAPED POLYMERIC STRUCTURES.

2,988,493. IRRADIATION SYNTHESIS OF SULFONYL VINYLAMINES.

The RCA Corporation offers to grant non-exclusive licenses on reasonable terms and conditions under the patents listed below. Inquiries respecting licenses under RCA patents should be addressed to RCA Corporation, Staff Vice President, Domestic Licensing, 30 Rockefeller Plaza, New York, N.Y. 10036.

4,036,651. ELECTROLESS COPPER PLATING BATH.

4,037,005. METHOD OF MAKING OPTICAL WAVEGUIDES AND PRODUCT BY THE PROCESS.

4,037,014. SEMICONDUCTOR ABSORBER FOR PHOTOTHERMAL CONVERTER.

4,037,114. TRI-STATE LOGIC CIRCUIT.

4,037,137. CENTERING CIRCUIT FOR A TELEVISION DEFLECTION SYSTEM.

4,037,140. PROTECTION CIRCUIT FOR INSULATED-GATE FIELD-EFFECT TRANSISTORS (IGFETS).

4,037,155. CURRENT-RESPONSIVE THRESHOLD DETECTION CIRCUITRY.

4,037,195. VEHICULAR SIGNAL LIGHT CONTROL SYSTEM.

4,037,267. PACKAGE FOR SEMICONDUCTOR COMPONENTS.

4,037,936. CORRECTING LENS HAVING TWO EFFECTIVE SURFACES.

4,037,942. OPTICAL ADJUSTMENT DEVICE.

4,038,106. FOUR-LAYER TRAPATT DIODE AND METHOD FOR MAKING SAME.

4,038,203. CERTAIN ALKALI METAL-RARE EARTH METAPHOSPHATE PHOTOLUMINESCENT GLASSES.

4,038,581. CIRCUIT FOR ELIMINATION OF SURFACE CHARGE INTEGRATION.

4,038,607. COMPLEMENTARY FIELD EFFECT TRANSISTOR AMPLIFIER.

4,038,616. VACUUM TUBE GAS TEST APPARATUS.

4,038,655. RADAR CONTOUR EDGE RESTORE CIRCUIT.

4,038,681. CHROMA-BURST SEPARATOR AND AMPLIFIER.

4,038,682. VIDEO DISC PLAYER APPARATUS FOR ESTABLISHING ELECTRICAL CONNECTION BETWEEN A STYLUS ELECTRODE AND A SIGNAL PROCESSING CIRCUIT.

4,038,683. TELEVISION SYNCHRONIZING GENERATOR.

4,038,685. APPARATUS FOR AUTOMATIC GAMMA CONTROL OF TELEVISION COLOR SIGNALS.

4,038,686. DEFECT DETECTION AND COMPENSATION.

4,038,687. VIDEO BLANKING CIRCUIT.

4,033,665. SYSTEM FOR RECORDING REDUNDANT FOURIER-TRANSFORM HOLOGRAM.

4,033,905. METHOD FOR INCREASING THE CONDUCTIVITY OF ELECTRICALLY RESISTIVE ORGANIC MATERIALS.

4,034,127. METHOD OF FORMING AND TREATING CADMIUM SELENIDE PHOTOCONDUCTIVE BODIES.

4,034,239. CAPACITANCE MEMORIES OPERATED WITH INTERMITTENTLY - ENERGIZED INTEGRATED CIRCUITS.

4,034,255. VANE STRUCTURE FOR A FLAT IMAGE DISPLAY DEVICE.

4,034,262. GATE DRIVE CIRCUIT FOR SCR DEFLECTION SYSTEM.

4,034,263. GATE DRIVE CIRCUIT FOR THYRISTOR DEFLECTION SYSTEM.

4,034,307. CURRENT AMPLIFIER.

4,034,320. HIGH POWER COAXIAL CAVITY RESONATOR TUNABLE OVER A BROAD BAND OF FREQUENCIES.

4,034,373. AIRBORNE MOVING-TARGET INDICATING RADAR SYSTEM.

4,034,382. APPARATUS FOR FORMING A COLOR TELEVISION PICTURE TUBE SCREEN.

4,034,399. INTERCONNECTION MEANS FOR AN ARRAY OF MAJORITY CARRIER MICROWAVE DEVICES.

4,035,055. COHERENT WAVE IMAGING AND/OR RECORDING TECHNIQUE FOR REDUCING THE GENERATION OF SPURIOUS COHERENT-WAVE IMAGE PATTERNS.

4,035,226. METHOD OF PREPARING PORTIONS OF A SEMICONDUCTOR WAFER SURFACE FOR FURTHER PROCESSING.

4,035,590. APPARATUS FOR ELECTROMECHANICAL RECORDING OF SHORT WAVELENGTH MODULATION IN A METAL MASTER.

4,035,757. SEMICONDUCTOR DEVICE RESISTORS HAVING SELECTED TEMPERATURE COEFFICIENTS.

4,035,822. PRESSURE SENSITIVE FIELD EFFECT DEVICE.

4,035,826. REDUCTION OF PARASITIC BIPOLAR EFFECTS IN INTEGRATED CIRCUITS EMPLOYING INSULATED GATE FIELD EFFECT TRANSISTORS VIA THE USE OF LOW RESISTANCE SUBSTRATE CONTACTS EXTENDING THROUGH SOURCE REGION.

4,035,827. THERMALLY BALLASTED SEMICONDUCTOR DEVICE.

4,035,828. SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE.

4,035,829. SEMICONDUCTOR DEVICE AND METHOD OF ELECTRICALLY ISOLATING CIRCUIT COMPONENTS THEREON.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF SEPTEMBER 24, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	11-4-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Ozo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-10-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	6-1-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	11-29-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	10-6-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	7-26-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-3-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	8-17-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	3-24-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	7-9-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	1-23-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	8-30-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	11-24-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	9-3-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	9-22-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	1-27-77

Expiration of patents: The patents within the range of numbers indicated below expire during September 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,951,249 to 2,954,559, inclusive

Plant Patents..... Numbers 1,970 to 1,973, inclusive

REISSUES

OCTOBER 11, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,432

APPARATUS FOR MEASURING AND POSITIONING OF FISH AT HEAD CUTTING

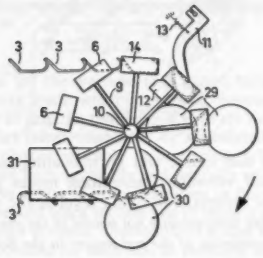
Leif Leander, and Curt Eriksson, both of Vastra Frolunda, Sweden, assignors to Arenco-KM AB, Vastra Frolunda, Sweden

Original No. 3,925,847, dated Dec. 16, 1975, Ser. No. 384,899, Aug. 2, 1973. Application for reissue Apr. 14, 1976, Ser. No. 677,032

Claims priority, application Sweden, Aug. 11, 1972, 10463/72

Int. Cl.[2] A22C *25/14*

U.S. Cl. 17—63 7 Claims



1. Apparatus for measuring fish and positioning them in an optimum position for deheading, said apparatus comprising a first conveyor having a path of movement and having a plurality of fish boxes carried thereby, each of said fish boxes being adapted to advance a fish carried thereby sideways with the fish head located on a particular side thereof,

a second conveyor having a path of movement extending adjacent and substantially parallel to part of the path of movement of said first conveyor and having a plurality of head boxes carried thereby,

sensing means for determining the thickness of a fish carried by a fish box in the region of the fish located immediately behind the eyes of the fish,

means for locating said sensing means in an interspace between the respective paths of movement of said fish boxes and said head boxes,

means for moving each of said plurality of head boxes of said second conveyor in synchronism with and in the same direction as and directly opposite to an individual fish box of said first conveyor along a portion of the path of movement of said second conveyor,

means for displacing each of said head boxes toward and away from an individual fish box in the longitudinal direction of a fish resting in said fish box,

a first control means fixedly mounted with respect to the paths of movement of said conveyors for actuating second control means in response to said sensing means,

a plurality of second control means for controlling said head box displacing means to optimum locations, a second control means connected to each of said head boxes and movable therewith in the path of movement of said second conveyor and for controlling said head box displacing means to move its connected head box longitudinally to an optimum location dependent upon the measured thickness of the fish in its connected head box, and

means for locking each head box at said optimum position.

Re. 29,433

AIR-POLLUTION PREVENTIVE ARRANGEMENT

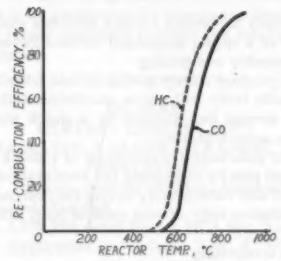
Yasuo Nakajima, Yokosuka; Takeji Oguri, Yokohama, and Hiroshi Kuroda, Tokyo, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Original No. 3,826,089, dated July 30, 1974, Ser. No. 160,278, July 7, 1971. Application for reissue Dec. 11, 1975, Ser. No. 639,701

Claims priority, application Japan, July 8, 1970, 45-59704; Oct. 19, 1970, 45-91519

Int. Cl.[2] F02B *75/10;* F01N *3/15*

U.S. Cl. 60—290 5 Claims



1. An air pollution preventive arrangement for use with an engine for a motor vehicle having an exhaust system through which exhaust gases emitted from the engine are discharged, comprising:

a thermal reactor mounted on said exhaust system and located posterior to exhaust ports of said exhaust system for primarily recombusting unconsumed hydrocarbons and carbon monoxides contained in said exhaust gases;

at least one catalytic converter mounted on said [exhuast] *exhaust* system and located posterior to said thermal reactor for secondarily recombusting the exhaust gases passed from said thermal reactor.

means for supplying additional air to said [exhuast] *exhaust* system anterior to said thermal reactor and to said exhaust system anterior to said catalytic converter, comprising:

a pneumatic pump;

a first passage leading from said pneumatic pump to said exhaust system anterior to said thermal reactor; and

a second passage leading from said pneumatic pump to said exhaust system anterior to said catalytic converter; and

means for controlling the amounts of said additional air to be supplied to said thermal reactor and said catalytic converter, respectively, comprising:

a one-way check valve mounted on said first passage for preventing a reverse flow of the exhaust gases from said exhaust system upstream of said thermal reactor,

a device including a valve means mounted on and normally closing said second passsage, said valve means being caused to open said second passage when actuated; and

a combination of detector and switch means which is responsive to deceleration conditions of the motor vehicle for closing said valve means when said conditions are detected thereby.

Re. 29,434
ASSEMBLY FOR TESTING SHOCK ABSORBERS INCORPORATED IN A VEHICLE

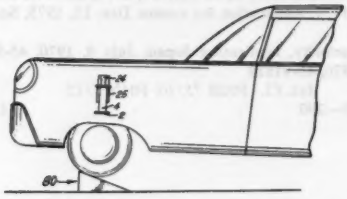
Alfred R. Bolliger, Im Sidefadeli, 8803 Ruschilkon, Switzerland

Original No. 3,939,692, dated Feb. 24, 1976, Ser. No. 475,920, June 3, 1974. Application for reissue Mar. 29, 1976, Ser. No. 671,489

Claims priority, application Switzerland, Nov. 5, 1973, 15556/73

Int. Cl.[2] G01M *17/04*

U.S. Cl. 73—11 **6 Claims**



1. An assembly for testing a shock absorber associated with a wheel pair of a spring suspended vehicle having a vehicle body, said assembly comprising

a. a step to produce a drop motion of said wheel pair so that said vehicle body will rise in oscillation under the influence of springs but damped by a shock absorber after dropping motion thereof,

b. means for indicating the condition of a shock absorber of said wheel pair by evaluating the acceleration inherent in the rise of said vehicle body during the first oscillation and first oscillation only of said vehicle body after dropping motion thereof,

said means comprising

i. means for sensing the acceleration of said vehicle body during the rise thereof, said means including an inertia body member which is freely mounted for vertical movement in a vertical path,

ii. means for mounting said sensing means to a body component of said vehicle body in the vicinity of a shock absorber to be tested,

iii. means extending into the vertical path of movement of said inertia body member for generating a signal upon movement of said body member in said vertical path more than a predetermined amount, and

iv. an indicating device responsive to the signal generated by said signal generating means for indicating movement more than said predetermined amount by said body member.

Re. 29,435
METHOD OF SUPERVISING THE FILLING LEVEL IN HOPPERS, SHAFTS, SILOS AND THE LIKE FOR MISCELLANEOUS MATERIALS AND MEANS FOR PERFORMING THE METHOD

Sven Gunnar Bergdahl, Uppl. Vasby, and Erik Torsten Wangdahl, Anmeberg, both of Sweden, assignors to Asea Aktiebolag, Vasteras, Sweden

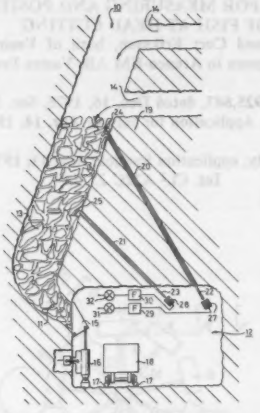
Original No. 3,927,569, dated Dec. 23, 1975, Ser. No. 453,389, Mar. 21, 1974. Application for reissue Mar. 25, 1976, Ser. No. 670,419

Claims priority, application Sweden, Mar. 21, 1973, 7303961

Int. Cl.[2] G01F *23/00*

U.S. Cl. 73—290 V **12 Claims**

7. Means for supervising the filling level and downward movement of granular material in a vertically elongated space, said space having a filling opening above the bottom thereof, comprising at least one sensing member arranged in the wall of said space above the bottom and located in the downward path of material fed into said space through said filling opening, *said sensing member comprising a rod device placed substantially spaced from the walls in the hole and being axially fastened near its end in the hole* whereby such material will come into contact with the member when falling down into the space as long as the level of the material in the space is below said member, said member being provided with vibration transmitting means responsive to the fall of material against said member when



passing into said space, and an indicating mechanism connected to said vibration transmitting means to indicate the movement of material and filling level in the space[.] *other vibrations being substantially not sensed in the member because of the spaced positioning of the rod means in the hole.*

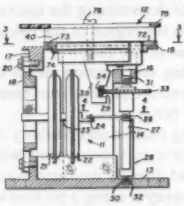
Re. 29,436
ENCODER FOR ALTIMETERS AND THE LIKE INSTRUMENTS

Robert M. Hulle, Calabasas; John Ferrero, Chatsworth, and Gerald Pannullo, Canoga Park, all of Calif., assignors to Trans-Cal Industries, Inc., Van Nuys, Calif.

Original No. 3,918,307, dated Nov. 11, 1975, Ser. No. 494,778, Aug. 5, 1974. Application for reissue Mar. 31, 1976, Ser. No. 672,114

Int. Cl.[2] G01L *7/14*

U.S. Cl. 73—387 **13 Claims**



1. Encoding means for altimeters or the like comprising

a frame,

a fluid pressure actuated device including a drive gear rotatably supported by said frame;

an encoding device including an encoder disc and a pinion connected to said encoder disc;

said pinion being engageable with said gear,

a support for said encoding device,

means on said frame forming a bearing,

an adjusting member supported by said bearing for rotational adjustment about the axis of said bearing,

said adjusting member supporting said support with the axis of said pinion eccentric to the axis of said bearing whereby said adjustment of said adjusting member will adjust said pinion relative to said gear, and

means for sensing the position of said encoder disc relative to said support.

Re. 29,437

DEVICE FOR THE VERTICAL AND LATERAL DISPLACEMENT OF RAILWAY TRACK

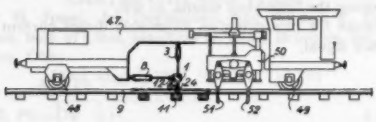
Hans Hurni, Pres Lausanne, Switzerland, assignor to Canron, Inc., Phillipsburg, N.J.

Original No. 3,832,952, dated Sept. 3, 1974, Ser. No. 308,945, Nov. 24, 1972. Application for reissue Sept. 1, 1976, Ser. No. 719,507

Claims priority, application Switzerland, Dec. 3, 1971, 17606/71

Int. Cl.[2] E01B *33/02*

U.S. Cl. 104—7 B **11 Claims**



1. Apparatus for the vertical and lateral movement of a section of railway track wherein gripping members operated so as to be able to grip the two lines of rails are mounted on at least one support frame connected by articulated connecting members to a chassis movable on the track, which support frame is movable both vertically and laterally relative to said chassis under the action of lifting members or lining members, in order to move said track section and to bring it into a predetermined reference position, characterized in that said gripping members are provided for each side of the track and are *transversely* displaceable, substantially in a straight line[, transversely in relation to the support frame] *along said support frame*; and in that rail engaging means, for each side of the track, are mounted on the support frame and are operable to engage the track so as to face the gripping members for the same side of the track.

Re. 29,438

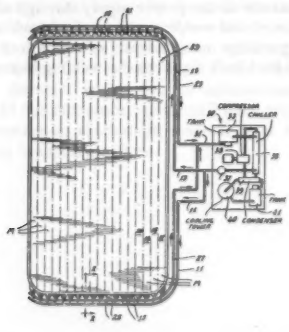
APPARATUS FOR CREATING AND MAINTAINING AN ICE SLAB

Calvin D. MacCracken, Englewood, N.J., and Helmut J. Schmidt, Greenlawn, N.Y., assignors to Calmac Manufacturing Corporation, Englewood, N.J.

Original No. 3,893,507, dated July 8, 1975, Ser. No. 387,148, Aug. 9, 1973. Division of Ser. No. 204,112, Dec. 2, 1971, Pat. No. 3,751,935. Application for reissue Mar. 25, 1976, Ser. No. 670,550

Int. Cl.[2] F28F *7/00*; **A63C** *19/10*

U.S. Cl. 165—46 **7 Claims**



1. A flexible portable plastic tubing mat adapted to be laid side-by-side with other similar mats for creating and maintaining an ice slab for skating and for preventing snow from melting on a ski slope and adapted to be laid end-to-end with other similar mats for creating an ice chute or trough for a toboggan slide or similar sliding purposes,

a. said portable mat having a length many times greater than its width with a plurality of small diameter flexible plastic tubing members extending lengthwise of said mat adapted to have cooled anti-freeze liquid pumped therethrough,

b. said flexible plastic tubing members having an inside diameter in the range from one-eighth to three-eighths of an inch,

c. securing means connected to said tubing members for securing them in a grid pattern in said mat,

d. said mat including supply and return sub-headers extending across one end of said mat with the ends of a plurality of said tubing members being connected respectively to said supply and return sub-headers with the direction of flow of the anti-freeze liquid being opposite in neighboring tubing members in the mat,

e. said flexible portable mat being rollable into a roll for ease of transportation, and

f. said sub-headers being adapted to be connected to main headers in an installation for interconnecting the plurality of said tubing members through the sub-headers to the main headers.

Re. 29,439

CERTAIN 1,2,4-OXA- AND -THIADIAZOL-5-YLTHIOALKANOIC ACID DERIVATIVES

John Henry Parsons, Saffron Walden, England, assignor to Fisons Limited, England

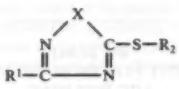
Original No. 3,770,754, dated Nov. 6, 1973, Ser. No. 80,165, Oct. 12, 1970. Application for reissue Nov. 4, 1975, Ser. No. 628,732

Claims priority, application United Kingdom, Oct. 18, 1969, 51248/69

Int. Cl.[2] C07D *271/06, 285/08*

U.S. Cl. 260—302 SD **38 Claims**

1. A compound of the formula:



wherein

R^1 represents [alkyl; alkyl substituted by halogen, alkoxy, carboxy, hydroxy or nitro;] phenyl; or phenyl substituted by halogen, alkyl, alkoxy or nitro,

R_2 is $-CH_2COOH$ or $-CH_2CH_2-COOH$

X is oxygen or sulphur

wherein the alkyl and alkoxy radicals have from 1 to 6 carbon atoms, or a herbicidal or plant *growth* regulant salt; [lower] *herbicidal or plant growth regulant* alkyl ester or unsubstituted amide of such compound.

Re. 29,440

CALCULATOR KEYBOARD SWITCH WITH DISC SPRING CONTACT AND PRINTED CIRCUIT BOARD

Gilbert H. Durkee, Fort Wayne, Ind.; Per G. Wareberg, Ottawa, Canada, and Alan C. Yoder, Fort Wayne, Ind., assignors to Bowmar Instrument Corporation, Fort Wayne, Ind.

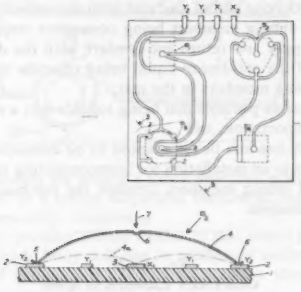
Original No. 3,796,843, dated Mar. 12, 1974, Ser. No. 320,147, Jan. 2, 1973. Application for reissue Mar. 9, 1976, Ser. No. 665,325

Int. Cl.[2] H01H *13/70*

U.S. Cl. 200—5 A **24 Claims**

23. In a keyboard switch assembly including a resilient, conductive switch device manually actuable from a normal to a deflected position, said switch device resiliently returning to its normal

position upon removal of force therefrom, the improvement comprising an insulative member having opposite surfaces, one of said surfaces having first and second elongated conductors thereon, said first conductor including a first switch terminal portion and said second conductor including a second switch terminal portion, said conductors and terminal portions being generally coplanar, said switch device being positioned in facing relationship with said one surface and said conductors, said switch device having first and second spaced contact areas thereon, said contact areas being respectively in registry with said terminal portions and engaging the same when said device is in said deflected position thereby electrically connecting said terminal portions, at least one of said



contact areas being spaced from the respective terminal portion in said normal position of said device, said one surface of said member having at least a third conductor thereon intermediate and spaced from said first and second conductors and generally coplanar therewith, said third conductor extending between said contact areas and under said device from a location on said one surface remote therefrom, means for maintaining said device in spaced relationship with said third conductor in both positions of said device whereby there is no electrical connection between said third conductor and said device in either position thereof, and means for holding said switch device and insulative member in operative relationship.

Re. 29,441

DIRECT CURRENT POWER SUPPLY FOR MANUAL ARC WELDING

Rolf Ericsson, Laxa, Sweden, assignor to Elektriska Svetsningsaktiebolaget, Goteborg, Sweden

Original No. 3,961,154, dated June 1, 1976, Ser. No. 515,415, Oct. 16, 1974. Continuation of Ser. No. 352,446, April 18, 1973, abandoned. Application for reissue Aug. 23, 1976, Ser. No. 716,889

Claims priority, application Sweden, Apr. 18, 1972, 4963/72

Int. Cl.[2] B23K *9/10*

U.S. Cl. 219—135 **3 Claims**

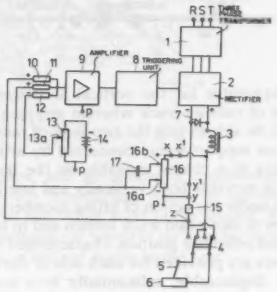
1. A direct current power supply for manual arc welding having a steeply drooping, adjustable volt-ampere characteristic comprising

a polyphase transformer having a plurality of secondary output leads carrying mutually phase displaced voltages, a polyphase rectifier system connecting said secondary output leads to a pair of D. C. welding current conductors, said rectifier system comprising a set of triggered rectifier valves connected one in series with each of said secondary output leads, said triggered rectifier valves having each a trigger terminal for initiating current flow through the valve,

means for periodically supplying igniting pulses to each of said trigger terminals, including means for causing the angular position of said pulses to vary in response to a direct current control signal, and,

means for producing said direct current control signal comprising the following means, to wit,

a. means for producing an adjustable direct current reference signal,



b. means including a welding current sensing means for producing a welding current feed-back direct current signal bearing a substantially fixed proportion to the welding current carried by the pair of welding current conductors,

c. means including a welding voltage sensing means for producing a welding voltage feed-back direct current signal proportional to the welding voltage between said welding current conductors,

d. summing means for combining said reference signal, said welding current feed-back signal and said welding voltage feed-back signal into a compound signal constituting the control signal aforementioned, both of said feed-back signals being supplied to said summing means in opposing relationship to said reference signal, said means for producing a welding voltage feed-back signal including means for adjustment of the slope of the volt-ampere characteristic of the power supply through adjustment of the ratio of said welding voltage feed-back signal to the welding voltage independently of the ratio of the welding current feed-back signal to the welding current.

PLANT PATENTS

GRANTED OCTOBER 11, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,122
CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, both of Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Aug. 6, 1976, Ser. No. 712,191
Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—79 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat. plant to be known by the cultivar name Marmalade and particularly characterized as to uniqueness by the combined characteristics of incurved inflorescence form, standard inflorescence type, red-bronze to orange-bronze inflorescence color, very tall plant height, uniform 10 week flowering response to photoperiodic short day control, and diameter across face of inflorescence up to 18 cm. at maturity.

4,123
CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, both of Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Aug. 6, 1976, Ser. No. 712,192
Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—77 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat. plant known by the cultivar name Jade and particularly characterized as to uniqueness by the combined characteristics of flat inflorescence form, reflexing slightly at full maturity; spider inflorescence type; ivory white inflorescence color; diameter across face of inflorescence ranging from 140 to 165 mm at maturity; uniform 9 week photoperiodic flowering response to short days; medium plant height; and semi-spreading branching pattern.

4,124
BEGONIA PLANT

Hans-Joachim Rohde, Nurtingen, Germany, assignor to Mikkelsens Inc., Ashtabula, Ohio

Filed Aug. 17, 1976, Ser. No. 715,101
Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of begonia plant characterized particularly as to uniqueness by the combined characteristics of bright yellow double flowers having a size up to 6 cm. in diameter when mature, with the flowers having an odd number of tepals; very fast growing habit which requires growth regulation for height control in high light and high temperature conditions, and long lasting nature of the individual flowers.

4,125
BEGONIA PLANT

Hans Joachim Rohde, Nurtingen, Germany, assignor to Mikkelsens Inc., Ashtabula, Ohio

Filed Aug. 17, 1976, Ser. No. 715,102
Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of begonia plant characterized particularly by the combined characteristics of bright, appleblossom pink colored, double flowers; short full compact and upright growth habit in all seasons; a high degree of self-branching; round, heavily textured dark green foliage with nearly complete edges; rapid propagation from leaf cuttings, with the cuttings consistently producing four to six adventitious shoots at all times of the year; excellent keeping quality and long flowering period, and by the uniform leaf area on each plant.

4,126
CHRYSANTHEMUM NAMED LEXINGTON

Leonard H. Shoesmith, Westfield-Woking, England, assignor to Pan-American Plant Company, West Chicago, Ill.

Filed Oct. 15, 1976, Ser. No. 733,471
Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of chrysanthemum substantially as shown and described, characterized by its single flower form with clear yellow ray florets which do not bronze when finished cool and which do not reflex upon opening, by its upright pot habit, and by its abundant production of dark green foliage.

PATENTS

GRANTED OCTOBER 11, 1977

ERRATA

For CLASS	See PATENT NO.
093–058.3	4,052,886
072–214	4,052,898
134–167 R	4,052,953
242–001.1 R	4,053,111
366–339	4,053,141
366–165	4,053,142
366–089	4,053,143
366–097	4,053,144
358–051	4,053,203
355–104	4,053,230
350–310	4,053,241
544–021	4,053,286
204–049	4,053,400
204–059 R	4,053,402
204–159.19	4,053,415
261–044 R	4,053,449
542–454	4,053,466
542–426	4,053,467
544–030	4,053,468
544–021	4,053,469
544–025	4,053,470
544–133	4,053,471
544–139	4,053,472
548–336	4,053,482
560–060	4,053,500
560–103	4,053,501
560–053	4,053,502
560–202	4,053,503
560–004	4,053,504
364–703	4,053,739
364–705	4,053,740
364–478	4,053,741
364–506	4,053,742
364–500	4,053,743
364–501	4,053,744
364–494	4,053,745
364–494	4,053,746
364–494	4,053,747
364–525	4,053,748
364–424	4,053,749
364–724	4,053,750
235–302.3	4,053,751
235–302.1	4,053,752
364–709	4,053,753
364–723	4,053,754
364–561	4,053,755

362–007	4,053,756
362–004	4,053,757
362–158	4,053,758
362–218	4,053,759
362–186	4,053,760
362–413	4,053,761
362–223	4,053,762
362–301	4,053,766
361–042	4,053,815
361–062	4,053,816
363–044	4,053,820
363–060	4,053,821
363–172	4,053,822
325–479	4,053,843
364–200	4,053,944

PATENTS

GRANTED OCTOBER 11, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

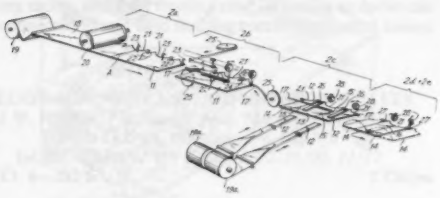
GENERAL AND MECHANICAL

4,052,752

METHOD OF MAKING A DISPOSABLE GARMENT

Charles B. Green, Lewisburg, Pa., assignor to International Paper Company, New York, N.Y.

Filed Dec. 15, 1976, Ser. No. 750,839
Int. Cl.[2] A41D *13/00*
U.S. Cl. 2—243 R **16 Claims**



1. A method of making a disposable garment comprising the steps of

cutting the body of the garment from a continuous web of material, the longitudinal axis of the body being in the cross direction of the web and the body having a central portion and having first and second lateral portions separated by and adjacent to the central portion;

applying a pair of first adhesive stripes to the body, one of the first adhesive stripes being applied to a selected one of the central and first lateral portions and the other of the first adhesive stripes being applied to a selected one of the central and second lateral portions;

applying a sleeve on each first adhesive stripe to partially adhere the sleeves to the body;

applying a first one of a pair of second adhesive stripes to a selected one of one of the sleeves and the portion of the body adjacent the portion to which the one of the first adhesive stripes is applied and a second one of the pair of second adhesive stripes being applied to a selected one of the other of the sleeves and the portion of the body adjacent the portion to which the other of the first adhesive stripes is applied; and

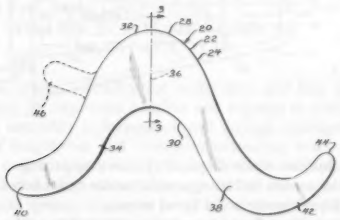
folding the lateral portions against the central portion of the body, whereby the sleeves are completely adhered to and enclosed within the body.

4,052,753

KNEE SPACER AND METHOD OF REFORMING SLIDING BODY SURFACES

Richard G. Dedo, 8629 La Losa Drive, West, Jacksonville, Fla. 32217

Filed Aug. 2, 1976, Ser. No. 710,402
Int. Cl.[2] A61F *1/00, 1/24*
U.S. Cl. 3—1 **21 Claims**



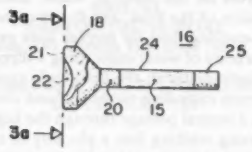
1. A knee spacer comprising, an elongated member of a flexible and relatively biologically inert material having a front surface, a back surface, and side edges defining a shape similar to the normal contour of the suprapatellar pouch of a human knee superior the femoral articular cartilage.

4,052,754

IMPLANTABLE STRUCTURE

Charles A. Homsy, 11526 Raintree Circle, Houston, Tex. 77024

Continuation-in-part of Ser. No. 604,624, Aug. 14, 1975, abandoned. This application July 14, 1976, Ser. No. 705,334
Int. Cl.[2] A61F *1/24, 1/18;* A61B *19/00;* A61N *1/04*
U.S. Cl. 3—1.9 **16 Claims**



1. A structure for in vivo implantation, comprising

an elongate biocompatible, porous element, said porous element having at least a portion of its length compressed so that the surface pores along said portion are closed,

one projecting end of said element being enlarged and having open pores throughout to allow tissue ingrowth therein,

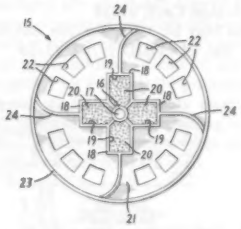
said porous element having the characteristics of promoting ingrowth of living tissue therein when implanted.

4,052,755

WAVE-QUELLING FLOAT

William H. Baker, 30 Honeysuckle Woods, Clover, S.C. 29710

Filed May 18, 1976, Ser. No. 687,578
Int. Cl.[2] E04H *3/16, 3/18*
U.S. Cl. 4—172 **45 Claims**



1. A wave-quelling float for marker lines extending across the surface of a body of water comprising a supporting body of lightweight plastic material; the float body comprising a hub and a web portion extending radially of and circumferentially about the hub; a central passage through the hub for reception of a float-tethering marking line; a plurality of buoyant members attached to the body and disposed at regular intervals about the hub in a manner to float the body such that at least one-half the body is above the water with the float balanced for free rotation in the water about a float-tethering line extending through the passage of the hub; and a plurality of wave-quelling vanes extending laterally from the web on at least one side thereof; the vanes being spaced and generally flat, and defining a plane at their inner portions, and being curved away from that plane at their outer ends so as to receive

surface surges and waves on the body of water, absorb the impact thereof as rotation of the float, and thereby quell them.

16. A wave-quelling float for marker lines extending across the surface of a body of water comprising a supporting body of lightweight plastic material; the float body comprising a hub and a web portion extending radially of and circumferentially about the hub; a central passage through the hub for reception of a float-tethering marking line; a plurality of float supports in the body, arranged radially about the hub a plurality of buoyant members carried by the float supports, and the float supports and buoyant members being disposed at regular intervals about the hub in a manner to float the body such that at least one-half the body is above the water with the float balanced for free rotation in the water about a float-tethering line; and a plurality of wave-quelling vanes extending laterally from the web in radial alignment with the float supports on at least one side thereof; the vanes being spaced and shaped to receive surges and waves on the body of water, absorb the impact thereof as rotation of the float, and thereby quell them.

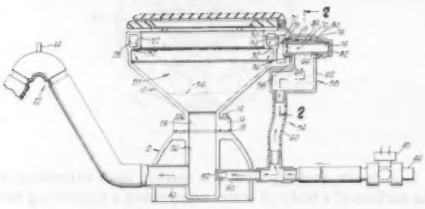
33. A wave-quelling float for marker lines extending across the surface of a body of water comprising a supporting body of lightweight plastic material; the float body comprising a hub and a web portion extending radially of and circumferentially about the hub; a central passage through the hub for reception of a float-tethering marking line; a plurality of air chambers in the body disposed at regular intervals about the hub in a manner to float the body such that at least one-half the body is above the water with the float balanced for free rotation in the water about a float-tethering line extending through the passage in the hub; the air chambers extending through the body and having open ends and end caps closing off the open ends; and a plurality of wave-quelling vanes extending laterally from the web on at least one side thereof; the vanes being spaced and shaped to receive surface surges and waves on the body of water, absorb the impact thereof as rotation of the float, and thereby quell them.

4,052,756

WET TYPE MARINE JET TOILET

Marvin E. Whiteman, Sr., deceased, late of Coronado Cays, Calif.; Willene Whiteman, co-executor, No. 5 The Point, Coronado Cays, Calif. 92118; Marvin E. Whiteman, Jr., co-executor, 1010 Antelope Mountain Road, Big Bear City, Calif. 92314, and Gary DeLong Whiteman, co-executor, 18643 Vintage St., Northridge, Calif. 91324

Filed May 10, 1976, Ser. No. 684,922
Int. Cl.[2] E03D *11/02, 11/18*
U.S. Cl. 4—73 **10 Claims**



1. In a marine toilet in which a toilet bowl structure has a top flushing rim and a bottom discharge outlet, said flushing rim and bottom outlet having flow connections with a controlled source of pressurized flushing fluid, the improvement comprising:

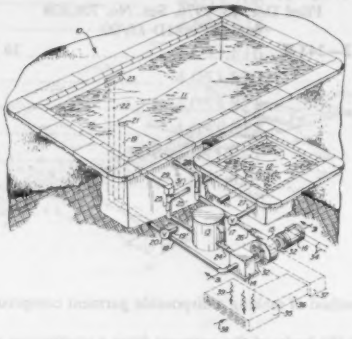
a. a reservoir tank positioned above the toilet bowl outlet, said tank having an outlet in connection with the flushing rim and an inlet in connection with said pressurized fluid source and said bottom outlet, whereby to receive and impound a quantity of the pressurized fluid during a flushing operation to discharge impounded fluid from the tank to the bottom discharge outlet into the bowl so as to form a normal fluid level therein.

4,052,757

HYDROTHERAPY INSTALLATION

Troy R. Dotson, 3702 E. Winchcomb, Phoenix, Ariz. 85032

Filed Jan. 29, 1976, Ser. No. 653,460
Int. Cl.[2] E04H *3/16, 3/18;* **F16L** *22/02*
U.S. Cl. 4—172.17 **5 Claims**



1. A hydrotherapy installation for pools comprising in combination:

a rotary driven shaft,

a pump assembly connected to said shaft for actuation thereof for pumping water to and from a pool,

a blower assembly connected to said shaft for actuation thereof,

means for transmitting air under pressure from said blower assembly to a pool,

an electric motor for rotating said shaft,

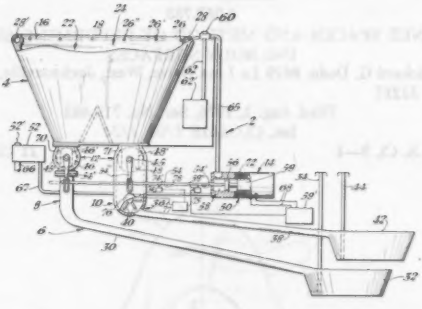
a cowling mounted around at least a part of said blower assembly for directing air into said blower assembly, and means for preheating the air received by said cowling.

4,052,758

HUMAN WASTE DISPOSAL SYSTEM

Frank Arena, 624 Southwind Circle, N. Palm Beach, Fla. 33408

Filed Sept. 12, 1975, Ser. No. 612,661
Int. Cl.[2] E03D *3/00, 11/00*
U.S. Cl. 4—79 **5 Claims**



1. A human waste disposal system comprising:

a toilet means including a solid waste toilet bowl means and a liquid waste toilet bowl means,

a low volume flushing means connected to said toilet means,

said low volume flushing means including fluid flushing nozzle distribution means connected to the upper portion of said toilet means,

a grinding and transfer mechanism connected to an outlet at the bottom of said solid waste toilet bowl means to provide movement of gravity feed waste into a first transfer conduit means,

said first transfer conduit means connected to said grinding and transfer mechanism,

a first storage means connected to said first transfer means,

a water inlet and an additive means inlet connected to said low volume flushing means,

a metering means including inlets and an outlet, said metering means connected to both said water inlet and said additive means inlet to distribute water and additive out through said metering means outlet, and

a fluid flushing conduit connected to an outlet of said metering means, said fluid flushing conduit having an outlet and connected to said fluid flushing nozzle distribution means.

4,052,759

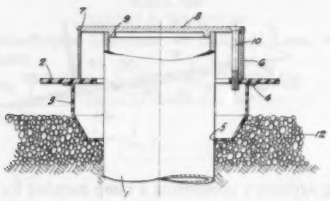
FLOOR-MOUNTED ANCHOR UNIT FOR TOILETS

Lloyd W. Hill, 2471 E. Gerard Ave., Merced, Calif. 95340

Filed Oct. 23, 1975, Ser. No. 625,070

Int. Cl.² E03D *11/00*; F16L *51/02, 55/00, 11/12*

U.S. Cl. 4—252 R **2 Claims**



1. In a floor-mounted anchor unit, for a toilet, which includes, in association with a floor, an annular, floor-supported, toilet attachment flange, there being a vertical sewer pipe riser disposed coaxially of the toilet attachment flange and extending upwardly therebelow, an annular, floor-engaging sub-flange concentrically surrounding the riser in spaced relation below the toilet attachment flange, and a plurality of vertical, circumferentially spaced screws connected in holding relation between the toilet attachment flange and sub-flange radially outwardly of the riser; the improvement characterized by the sub-flange including a cup-like shroud fixed on and depending from said sub-flange, and the shroud having a circular bottom opening through which the riser extends in matching frictional relation whereby the shroud positionally supports the sub-flange from the riser upon initial placement of such sub-flange on said riser, and the shroud being of a diameter such that said shroud encompasses, in protecting relation, lower end portions of the screws which project below the sub-flange.

4,052,760

COIL SPRING ASSEMBLY

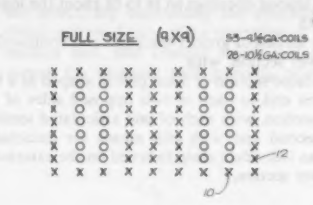
Gerald A. Golembeck, Lake Elmo, and Ralph J. Marx, St. Paul, both of Minn., assignors to The United States Bedding Company, St. Paul, Minn.

Filed Feb. 23, 1976, Ser. No. 660,763

Int. Cl.² A47C *23/04*

U.S. Cl. 5—248 **1 Claim**

1. A coil spring assembly for mattresses and box springs characterized by improved comfort and support in which the coil spring assembly is formed of coil springs arranged in a plurality of lengthwise and crosswise extending rows and in which the coil springs consist of two sets of coil springs in which the coil springs of both sets are of the same size but in which the coil springs of one set are of lower gauge and greater stiffness than the coil springs of the other set with the outermost coil springs in each of the lengthwise and crosswise extending rows and in the middle rows extending lengthwise of the spring assembly being of the one set while the coil springs remaining in the rows adjacent the outermost lengthwise rows being of the other set with the number of lengthwise



rows of coil springs of the one set comprising at least half of the lengthwise rows of coil springs in the spring assembly.

4,052,761

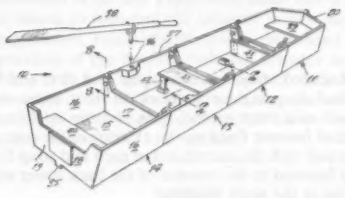
CARTOP TRUNK BOAT

Charles A. Rilling, 191 Carman Hill Road No. 2, New Millford, Conn. 06776

Filed July 6, 1976, Ser. No. 702,945

Int. Cl.² B63B *7/04*

U.S. Cl. 9—2 S **2 Claims**



1. A cartop trunk boat, comprising in combination, a plurality of boat sections including a bow section, a forward central section, an aft central section and a stern section, said sections being detachably attachable together to form said boat, said sections when detached, nesting into each other for compact transportation on a car roof rack, wherein each said section comprises an open box made of molded plastic and including a bottom, opposite side walls and an aft and forward wall, wherein said sections are attachable together by means of a hook along a lower portion of said forward walls being receivable in an upward groove formed on an aft wall of an adjacent said section; and upper corners of said aft and forward walls being locked together by a forwardly projecting stud at each said corner of said aft wall removably received through an opening of said forward wall, a projecting end of said stud having an annular groove receiving a vertically slidable yoke in a frame mounted on said forward wall.

4,052,762

BABY LIFE PRESERVER

Phyllis D. Zawislak, Huntington, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed June 14, 1976, Ser. No. 695,731

Int. Cl.² B63C *9/10*

U.S. Cl. 9—337 **1 Claim**

1. A child's life preserver formed of buoyant foam plastic sections joined together to form a vest and shaped so in the worn position the upper sections of the vest are of greater volume than the lower sections of the vest to provide a greater degree of buoyancy to the upper section of the body of the wearer and to cause the wearer to float in a vertical upright position in the water, comprising:

a front section and a rear section, each formed of an upper section of a shaped semi-rigid block of foam plastic material joined to a lower section of a shaped block of similar material, with

a section of shaped webbing joined at opposed ends to the bottom edges of the two said lower sections, said webbing formed with shaped openings so as to fit about the legs of a wearer, with

each said upper section of greater thickness and volume than each said lower section, with

a flexible articulated section of foam plastic shaped as a belt fitted at a first end to each of two opposed sides of the front lower section, with each of said articulated sections fitted at a second end with clip means for detachably fastening to an individual clasp fastened on the exterior of the back lower section,

a pair of spaced straps each fastened at a first end by an individual clasp to the exterior of the front upper section, and each said strap extending in slidable relation to an individual fastener fixed on the exterior of the rear upper section and with the second end of each said strap fixed to a clasp fastened to the exterior of the back lower section, such that in the worn position

each strap fits about a shoulder of the wearer and each articulated belt section fits about a side of the wearer to hold the back section and the front section in their respective positions about the wearer.

4,052,763

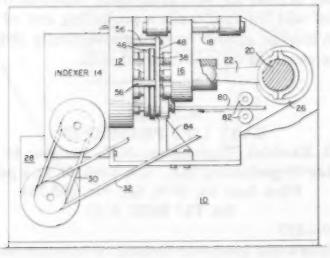
RIVET MAKING METHOD

Albert Dunkin, 12 Split Rock Road, South Norwalk, Conn. 06854

Division of Ser. No. 651,149, Jan. 21, 1976, Pat. No. 4,019,432. This application Nov. 11, 1976, Ser. No. 740,923

Int. Cl.[2] B21K *1/44, 1/58*

U.S. Cl. 10—27 R **2 Claims**



1. The method of making rivets and other headed articles comprising the steps of:

successively loading a blank in a direction from one end toward the other end of a plurality of blank holding dies supported for concurrent lateral indexing movement in relation to laterally spaced working stations and for independent axial movement at each of said stations;

simultaneously shaping said blanks in a plurality of said dies after concurrent lateral indexing movement thereof to said working stations to form a head against the other end of each die, each blank thereby being shaped progressively upon indexing movement to successive ones of said working stations;

axially positioning each blank and each die at each of said stations independently of others of said blanks and said dies at others of said stations as necessary for the performance of each of said shaping steps concurrently; and

returning all of said dies to a common axial position after each of said shaping steps and prior to indexing movement of said dies.

4,052,764

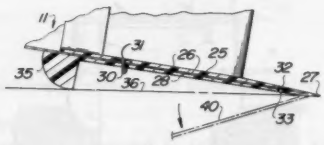
BAG ACCESSORY

Harold M. Groff, Santa Ana, Calif., assignor to Donald M. Groff, Medford, N.J., a part interest

Filed Feb. 19, 1976, Ser. No. 659,260

Int. Cl.[2] A47L *13/52;* **B65B** *67/12*

U.S. Cl. 15—257.9 **7 Claims**



1. A bag accessory comprising a ramp member for location in the bag mouth and extending therebeyond to and terminating in a distal edge, bag gripping means carried by said ramp member for releasably securing a bag to the ramp member in the bag mouth, bag distention means associated with said ramp member for holding a gripped bag open, said ramp distal edge being engageable with a work surface for guiding material from the surface into an open bag, suspension means associated with said ramp member for selectively suspending said bag in open position to receive gravitationally falling material, said bag gripping means comprising a gripping member hingedly connected to said ramp member adjacent to said distal ramp edge for swinging movement toward and away from said ramp member and combining therewith to releasably grip an interposed bag edge portion, and support means on said gripping member remote from said distal ramp edge and engageable with said work surface to maintain said ramp in inclined relation.

4,052,765

VACUUM CLEANER

Wieland Gühne, Remscheid, and Klaus Hoffmann, Haan, both of Germany, assignors to Vorwerk & Co. Elektrowerke GmbH & Co. KG, Wuppertal, Germany

Filed Dec. 10, 1975, Ser. No. 639,231

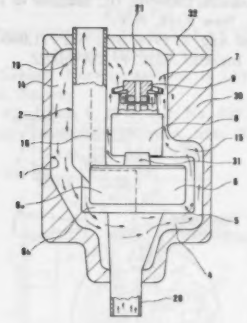
Claims priority, application Germany, Dec. 21, 1974, 2460863

Int. Cl.[2] A47L *5/24, 9/22*

U.S. Cl. 15—344 **18 Claims**

18. In a vacuum cleaner, particularly a hand-held vacuum cleaner, in combination, housing means defining a first space and a separate second space which is surrounded by but does not communicate with the first space; impeller means in the second space for sucking dust-laden air into one end of the second space and discharging it out the other; drive means for driving the impeller means, the drive means being located in the first space so as not to be contacted by the dust-laden air

passing through the second space but so as to be nevertheless cooled by such dast-laden air; and heat-exchanging means for



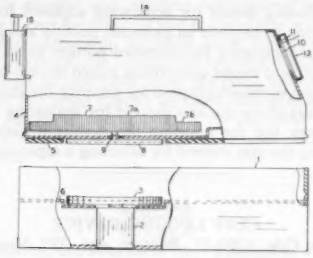
effecting an exchange of heat between the air in the first space and the impelled air in the second space.

4,052,766

HAND SCRUBBER

Gordon MacRitchie Morrison, 45 Ballpark Lane, Hicksville, N.Y. 11801

Filed May 6, 1976, Ser. No. 683,766
Int. Cl.[2] A46B *13/04*
U.S. Cl. 15—21 C **5 Claims**



1. Hand scrubbing means comprising a hollow base member,
a motor mounted in said base member,
a shaft driven by said motor,
a drive dog connected to the shaft of said motor,
a hollow container removably mounted in said base,
said container having a driven dog meshing with said drive dog,
a shaft driven by said driven dog,
a brush mounted in said container and connected to the shaft of said driven dog for rotation,
said container having a front surface having an aperture so that a hand may be inserted into contact with said brush,
said container having no permanent connection with the base so that it is easily removable.

4,052,767

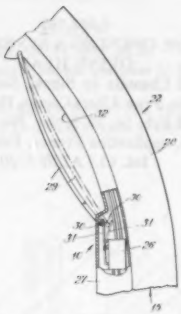
POWER DRIVEN BRUSH DRIVE CONTROL

Ival G. Dutcher, White Bear Lake, Minn., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Nov. 7, 1975, Ser. No. 629,845
Int. Cl.[2] A47L *9/28*
U.S. Cl. 15—377 **9 Claims**

1. In a vacuum cleaner having a selectively operable motor driven suction unit, a dirt pickup means including a motor driven rotary brush for brushing the surface to be cleaned for facilitated dirt pickup therefrom by a pickup means, and a handle having a gripping portion to be gripped by a user in a gripping manner as required for moving the dirt pickup means along said surface, the improvement comprising

control means carried by said handle at said gripping portion for selectively controlling the operation of the driven brush independently of the operation of the motor driven suction unit, said control means including an actuator means for bridging said gripping portion to preclude



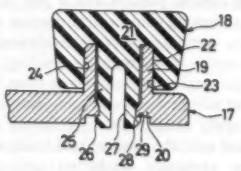
movement of the user's hand from either end of said actuator means to between said actuator means and said gripping portion, said actuator means being biased to prevent operation of the driven brush, the actuator means being arranged to be engaged by the hand of the user to cause operation of the driven brush whenever the user grips the handle gripping portion as required for moving the dirt pickup means along said surface.

4,052,768

HANDLE OF A WINDOW REGULATOR FOR VEHICLES

Takeo Yamazaki, Anjo, and Kuniyoshi Harada, Toyota, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Mar. 30, 1976, Ser. No. 671,997
Claims priority, application Japan, Apr. 11, 1975, 50-44431
Int. Cl.[2] B25G *3/00*
U.S. Cl. 16—121 **7 Claims**



1. A handle of a window regulator for vehicles, comprising
a main body of a handle including a cylindrical projecting portion vertically extended from one end thereof and an opened shoulder portion formed on an inner end of said cylindrical projecting portion; and
a knob member operatively attached to said one end of said main body of said handle comprises a knob member main body, an annular groove formed in said main body of said knob member for inserting said cylindrical projecting portion of said main body of said handle thereinto, an extending portion vertically extended from said main body of said knob member for supporting said cylindrical projecting portion of said main body of said handle, a bearing portion formed on an inner surface of said annular groove for bearing an outer surface of said projecting portion of said main body of said handle, a flange portion formed on an end of said extending portion for joining with said shoulder portion of said main body of said han-

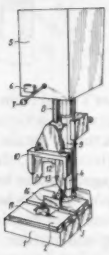
dle, the outer diameter of said flange portion being the same as or less than the outer diameter of said extending portion, and an axial slot formed in said extending portion and being capable of inwardly and elastically bending into a minimizing direction of the outer diameter of said flange portion.

4,052,769

MACHINE FOR OPENING A SEVERED BOVINE OR OVINE HEAD

Antoine Thillet, 5 Chemain du Signal, Sainte Foy, (Lyon), and Tomaso Morello, 5 rue Albert Camus, Decines, both of France

Filed Feb. 14, 1975, Ser. No. 550,018
Claims priority, application France, Feb. 15, 1974, 74.05858
Int. Cl.² A22B *5/20*
U.S. Cl. 17—23 **5 Claims**



1. An apparatus for opening a severed livestock head, said apparatus comprising:

a base;

a pair of upwardly directed and parallel base blades on said base spaced to support said head at the back thereof;

a vertically displaceable blade of wedge-shaped cross section directed downwardly toward said base blades and positioned to open the back of said transversely thereto, said vertically displaceable blade having a downwardly concave central portion and a pair of symmetrical side portions flanking said central portion and each having a generally vertical upper region terminating at said central portion and a lower region extending downwardly from said upper region laterally away from the other side portion, said side portions and said central portion forming a downwardly open outwardly flaring U adapted to embrace and split the skull of said head; and

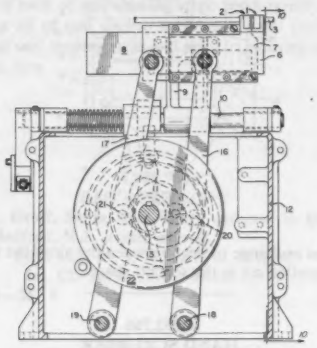
means for vertically displacing said displaceable blade toward and away from said base blades while maintaining said displaceable blade parallel to said base blades, said displaceable blade being engageable between said base blades, each of said blades having a first face substantially parallel to the displacement direction of said displaceable blade and a second face inclined to said direction and forming with the respective first face a cutting edge, at least one of said base blades being upwardly concave at its cutting edge, said means for displacing including a holder for said displaceable blade having a pressing element with a pressing surface lying transverse to the displacement direction of said displaceable blade, said displaceable blade having a cutting edge spaced in said direction from said surface by a predetermined distance corresponding to the penetration distance of said displaceable blade into said head, said head having an upper face lying at a predetermined angle when said head is resting on said base blades, said pressing surface being inclined to the vertical at substantially the same angle as said face.

4,052,770

METHOD AND APPARATUS FOR SEVERING THIN-WALLED TUBING ON A MANDREL

Dixon Redfern Asquith, Danville, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Aug. 2, 1976, Ser. No. 711,040
Int. Cl.² A22C *11/02, 13/02*
U.S. Cl. 17—42 **9 Claims**



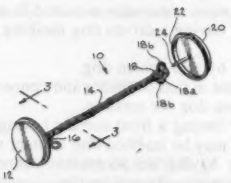
1. In a machine for continuously shirring a thin-walled sausage casing or the like on a mandrel, an improved device for severing a strand of the shirred casing from the following shirred casing while the casing moves along the mandrel, said device including means for separating adjacent folds of the shirred casing to provide an extended portion along the mandrel and for tensioning the extended portion to effect separation thereof, said means comprising paired double-jawed resilient clamping members adapted for gripping the shirred casing at two points along the axis thereof for deshirring the casing therebetween and for grasping the deshirred casing at two points along the axis thereof for effecting a separation therein.

4,052,771

CUFF LINKING DEVICE

Cody Jack Cole, 6200 W. Bellfort, Apt. 257, Houston, Tex. 77035

Filed June 7, 1976, Ser. No. 693,722
Int. Cl.² A44B *1/18, 1/34*
U.S. Cl. 24—102 SL **1 Claim**



1. A cuff linking device composed of a disc shaped member to which is attached one end of a length of jewelry chain by means of an eyelet, said eyelet having outwardly extending flexible retaining members, said members having a loop formed at the ends thereof, and the other end of said jewelry chain securely attached to a clasping member having a hole therein to receive a stud member, said clasping device having loops formed thereon for frictionally gripping said stud member, and a second disc shaped member having an outer side identical in appearance to the first disc shaped member and the inner side being sufficiently recessed to enclose and cover an existing button, said recess having a stud member securely attached

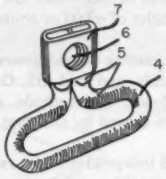
therein and extending outwardly to a length sufficient to penetrate a hole in an existing button, the underlying fabric material, and the hole and looped ends of said clasping member.

4,052,772

PILLAR LOOP FOR BELTS, SUCH AS SEAT BELTS IN CARS OR THE LIKE

Ulf Tolfsen, Gralum, Norway, assignor to Loyo's Indistri A/S, Fredrikstad, Norway

Filed Dec. 9, 1975, Ser. No. 639,171
Claims priority, application Norway, May 20, 1975, 1778/75
Int. Cl.[2] A44B *11/00*
U.S. Cl. 24—163 FC **4 Claims**



1. In a pillar loop for belts, such as for seat belts in cars and the like, said pillar loop being securable to a vehicle for guiding a belt extending through a portion of said pillar loop, the improvement wherein said pillar loop is formed of a length of round steel bent into a loop through which a belt is adapted to be passed, said length of round steel having end portions bent towards one another in an angle of 90° so that said end portions extend in a paraliel and adjacent relationship, and further comprising means for securing said end portions in the parallel and adjacent relationship including an at least partially flattened tube having a hole formed therein, said hole serving for the attachment of said pillar loop, the pillar loop portion for guiding said belt being slightly bent and twisted relative to the remaining portion of said pillar loop, for said pillar loop to be securable in a somewhat inclined position relative to a surface of the vehicle

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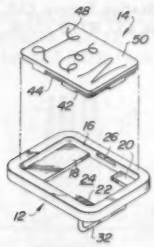
4,052,773

BUCKLE

Leroy E. Nesbitt, 6213 Gardenia St., Philadelphia, Pa. 19144

Filed Nov. 7, 1975, Ser. No. 629,820
Int. Cl.[2] A44B *11/00;* **A44C** *17/02*
U.S. Cl. 24—163 K **8 Claims**



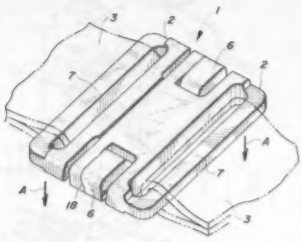
1. A buckle comprising a body having front and rear major faces with a recess on one major face thereof, said body having an opening therethrough and communicating with said recess, said body having means defining a support means in said recess adjacent the periphery of said opening, an ornamental member having front and rear major faces disposed in said recess and removably coupled to said body and supported by said support means, said body having at least one groove communicating with said recess and said member having at least one cavity opposite said groove, a spring having at least one portion partially disposed in said cavity and said groove, means defining an access hole in a major face of and said ornamental member, said access hole being accessible from the exterior of said body when said ornamental member is supported by said support means, said access hole communicating with one of said cavity and said groove to facilitate movement of the spring from said groove to said cavity to thereby facilitate uncoupling of said member from said body and attachment means for facilitating attaching the buckle to a support structure.

4,052,774

PLASTIC BUCKLE

Taizo Noda, Nishinomiya, Japan, assignor to Kohshoh Limited, Kyoto, Japan

Filed Nov. 26, 1976, Ser. No. 745,002
Int. Cl.[2] A44B *13/00, 21/00*
U.S. Cl. 24—201 A **9 Claims**



1. A plastic buckle comprising a pair of plastic engaging elements each of which includes a plate portion having a means for attaching a belt or the like thereto, a base plate portion extended from the longitudinal edge of the plate portion, one surface of the base plate portion being substantially in the same plate with one surface of the plate portion and the other surface thereof at such a level as having the thickness half the thickness of the plate portion, and two engaging portions extended from the edge of the base plate portion so as to be in parallel with the longitudinal edge of the plate portion and so as to have substantially the same planes with those of the plate portion, the plate portion, the base plate portion and the engaging portions being integrally formed, the width of the upper surface of each engaging portion defined by the upper edge of the inner side thereof and the corresponding upper edge of the outer side thereof being somewhat larger than that of the space defined by the upper edge of the inner side of the engaging portion and the corresponding inner edge of the plate portion, each engaging portion being provided at the inside surface thereof with a fitting means.

4,052,775

SAFETY SEAT BELT BUCKLE

James A. Gavagan, Center Line, and Carl Mogens Petersen, III, Pontiac, both of Mich., assignors to Irvin Industries, Inc., Stamford, Conn.

Continuation of Ser. No. 439,732, Feb. 5, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,240
Int. Cl.[2] A44B *11/26, 11/00*
U.S. Cl. 24—230 A **6 Claims**

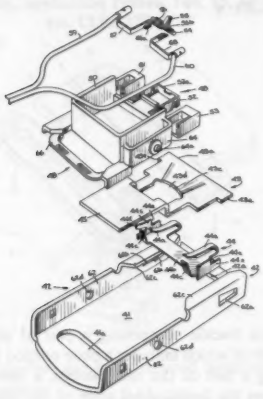
1. In a safety seat belt buckle, the improvement comprising:
a housing, a clip-holding latching lever and a spring constituting a three element operative unit apart from the rest of the buckle,
said housing having an open top, a base and first and second opposed side walls integral with said base, said side walls of said housing each having an opening, said opening having a forward edge and an upper edge,
said clip-holding latching lever having a push button releas-

ing portion and a transversely extending forward edge, said lever mounted for limited pivotal movement within said housing,

said spring being mounted between said lever and said base of said housing, said lever when depressed compressing said spring, said spring engaging said lever and said housing, said spring and said housing providing the sole support for said lever,

said lever having a pair of outwardly extending ears integral therewith, said ears extending into said side wall openings of said housing, said ears having a forward edge and an upper surface,

said forward edge of said ears bearing against said forward edge of said side wall openings to provide resistance against forward movement of said lever in said housing when a clip is engaged by said lever,



the upward position of said forward edge of said lever being limited by said upper edge of said side wall openings of said housing,

the forward portion of said housing having members extending inwardly from said side walls, said members, said side walls and said lever serving to receive and guide the mating clip,

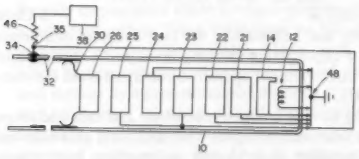
said housing having a front portion extending up from said base and integral therewith, said forward edge of said lever being closely spaced from said front portion of said housing, said spacing between said lever and said front portion of said housing having a relationship to the elasticity of said lever and housing such that under pre-determined load conditions, said forward edge of said lever engages said front portion of said housing.

4,052,776

METHOD OF SPOT-KNOCKING AN ELECTRON GUN ASSEMBLY IN A COLOR TELEVISION PICTURE TUBE

Roy Maskell, Oak Park, and Armando V. Marino, Chicago, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed Sept. 30, 1976, Ser. No. 728,108
Int. Cl.[2] H01J *9/02*
U.S. Cl. 29—25.11 **5 Claims**



1. For use in the manufacture of an electron gun having a heater and cathode, a control grid (G1), a screen grid (G2), and four main focus lens electrodes (G3, G4, G5 and G6) wherein a first relatively large gap exists between G2 and G3, between G3 and G4, between G4 and G5, and between G5 and G6, and a second relatively small gap exists between G1 and G2, and a third relatively very small gap exists between G1 and said cathode, a method for spot-knocking said electron gun comprising

establishing said heater and cathode, said G1 and G2 grids and said G3, G4 and G5 electrodes at substantially ground potential;

applying a first fluctuating DC voltage to electrode G6 of a magnitude and for a time effective to cause arcs to occur between portions of electrodes G5 and G6, so as to remove any particles of metal or contaminants on said electrodes;

whereby said grounding of said heater and cathode of said G1 and G2 grids, and said G3, G4 and G5 electrodes protects said heater and cathode, and said G1 and G2 grids from arcs caused by said first fluctuating DC voltage;

in a separate and independent step, establishing said heater and cathode, said G1 and G2 grids and said G4 electrode at substantially ground potential and removing said ground potential from said G3 and G5 electrodes;

applying a second fluctuating DC voltage with an amplitude less than said first fluctuating DC voltage to electrodes G3, G5 and G6 of a magnitude and for a time effective to cause arcs to occur between portions of said electrodes G4 and G5, between portions of said electrodes G4 and G3 and between portions of said electrodes G2 and G3 so as to remove any sharp particles of metal or contaminants on said G2, G3, G4 and G5 electrodes;

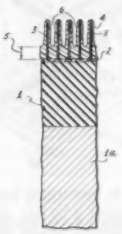
whereby said grounding of said heater and cathode and said grounding of said G1 and G2 grids protects said heater and cathode from arcs caused by said second fluctuating DC voltage.

4,052,777

ROLLERS FOR USE IN PRINTING AND METHOD OF MAKING SAME

Alain Meudec, rue de la Tour Coulon, 89000 Laborde par Auxerre, France

Filed Sept. 30, 1974, Ser. No. 510,721
Claims priority, application France, Oct. 4, 1973, 73.35466
Int. Cl.[2] B21B *31/08*
U.S. Cl. 29—120 **12 Claims**

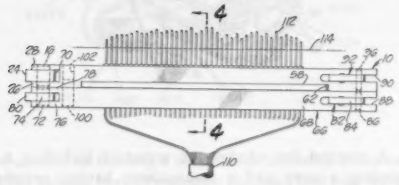


1. Printing roller comprising a support, a first thin adhesive layer on said support flocked with textile fibers having one end adhesively secured to and embedded in said first layer and projecting radially therefrom, a second layer of elastic binder applied on said first layer and connecting said fibers to each other, the thickness of said second layer being greater than that of said first layer, and said fibers projecting outwardly beyond said second layer.

4,052,778
APPARATUS FOR THE SIMULTANEOUS TERMINATION IN TERMINAL SLEEVES OF A PLURALITY OF WIRES WITH A MULTI-PIN CONNECTOR

Dennis Carl Siden, Portolla Valley, and Corey John McMills, Los Altos, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Division of Ser. No. 442,580, Feb. 14, 1974, Pat. No. 3,945,114. This application Jan. 30, 1976, Ser. No. 653,754
Int. Cl.² H01R 43/00
U.S. Cl. 29—749 13 Claims



1. An assembly to aid in the termination of a plurality of wires with a multi-pin connector, comprising

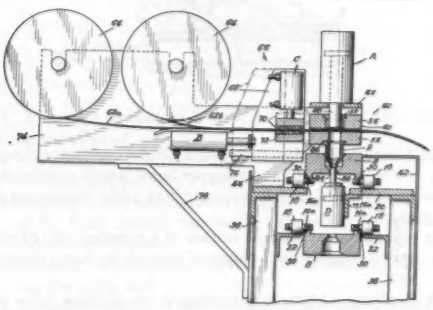
an identification block including two elongated members pivotally hinged together at one end, a latching assembly to hold said elongated members together, recesses provided in the mating surfaces of said elongated members forming a cavity for receiving and holding terminal sleeves in specific orientation, said elongated members providing for the passage of wires between said elongated members when held together and through the terminal sleeves; and

a wire clamp, said wire clamp including two jaws pivotally coupled at one end, and a latching assembly for selectively holding said jaws together; said identification block and said wire clamp being capable of holding and positioning a plurality of wires such that the wires may be drawn through the identification block longitudinally in a first direction and are prevented from moving longitudinally in a second direction through said identification block.

4,052,779
METHOD FOR ASSEMBLING MICRO-FILTER UNITS

H. Eric Hunter, Westwood, Calif., assignor to Charter-Wallace, Inc., New York, N.Y.

Division of Ser. No. 563,663, March 31, 1975, Pat. No. 3,973,313. This application Apr. 22, 1976, Ser. No. 679,360
Int. Cl.² B23P 19/00
U.S. Cl. 29—429 11 Claims

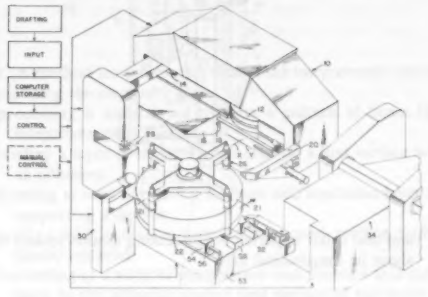


1. A process for assembling micro-filter units having a barrel, a plug adapted for insertion into said barrel, and a filter disc clamped between the barrel and the plug, which comprises seating said barrel holder, punching out the filter disc from a sheet of filter stock with a unitary punch, and seating it in the barrel in said barrel holder with a single stroke of the punch.

4,052,780
PUNCHING, CONTOURING, HANDLING APPARATUSES AND METHOD

Dennis Daniels, Bellevue, Wash., assignor to U.S. Amada, Ltd.

Division of Ser. No. 386,064, Aug. 6, 1973, Pat. No. 3,949,635, which is a continuation-in-part of Ser. No. 359,983, May 14, 1973. This application Feb. 18, 1975, Ser. No. 550,861
Int. Cl.² B23Q 7/02; B23C 3/04
U.S. Cl. 29—558 6 Claims



1. The method of punching and separating sheet parts from a larger worksheet comprising the steps of automatically punching a part integral with the worksheet on a program controlled rotary turret punch press at a punching station, said part having a reference point located thereon for subsequent positioning,

automatically separating the part from the worksheet,

automatically engaging the part at a discharge station at a variable location and transferring the part to an adjacent location, and

at said adjacent location automatically receiving the part in a position and orientation relative to said reference point whereby the part is automatically punched and separated from the worksheet and accurately positioned at the adjacent location removed from the punch press,

said step of automatically clamping and separating the part including rotating the turret 90° and carrying the part on said turret separate from the worksheet.

4,052,781
ROTATION-TO-RECIPROCATING MOTION CONVERTING TOOL

B. Paul Sanford, Houston, Tex., assignor to Cougar Instruments Corporation, Houston, Tex.

Filed July 8, 1976, Ser. No. 703,491
Int. Cl.² B23P 23/00
U.S. Cl. 29—560 6 Claims

1. A tool attachment for a machine having a rotatable member, said tool converting rotating into reciprocating motion, comprising:

a hollow traveling body having a radial bore and an axial bore therein;

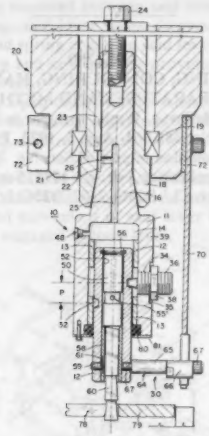
a bearing housing mounted in said radial bore,

a ram movably mounted in said axial bore and having on its periphery a single groove, the groove having a pitch depending on the desired reciprocating stroke of the ram;

a roller rotatably mounted in said bearing housing and having a portion thereof rollably disposed in said groove, and

restraining means coupled between said ram and said machine, whereby, in use said ram remains restrained against

rotation and unrestrained against longitudinal motion, upon rotation of said traveling body in either direction,



and said roller imparts a reciprocating motion to said ram about its longitudinal axis.

4,052,782

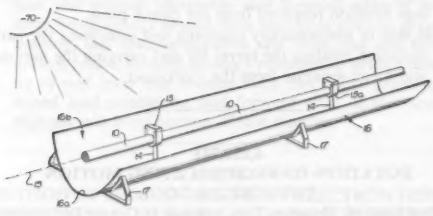
TUBULAR SOLAR CELL AND METHOD OF MAKING SAME

Harold Weinstein, Sherman Oaks, and Ray H. Lee, Calabasas, both of Calif., assignors to Sensor Technology, Inc., Chatsworth, Calif.

Division of Ser. No. 502,272, Sept. 3, 1974, Pat. No. 3,990,914. This application Feb. 26, 1976, Ser. No. 661,778

Int. Cl.[2] B01J *17/00*

U.S. Cl. 29—572 **15 Claims**



1. A process for promoting oriented crystalline growth on a glass surface, consisting of;

coating said glass surface with a film of a metal having a eutectic temperature with silicon of less than the melting temperature of said glass;

depositing silicon atop said metal film,

heating said metal film and said deposited silicon to approximately said eutectic temperature, then lowering the temperature to below said eutectic temperature to cause separation of the silicon from said metal, thereby forming islands of crystalline silicon in said metal film,

growing additional silicon atop said layer of metal, said silicon crystalline islands serving as growth centers promoting oriented crystalline growth of said additional silicon.

4,052,783

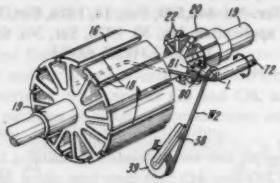
APPARATUS AND METHOD FOR WINDING ARMATURES

Lawrence A. Shively, 6014 Frederick Road, Dayton, Ohio 45414

Filed May 17, 1976, Ser. No. 687,018

Int. Cl.[2] H02K *15/09*

U.S. Cl. 29—597 **24 Claims**



1. A method for winding an armature including a shaft supporting a core and a commutator having peripherally spaced tangs, comprising the steps of winding a wire on said core to form a wire coil, extending the wire from the wire coil about a member supported for movement, moving said member for twisting the wire to form a twisted wire loop on said member, transferring the twisted wire loop from said member to one of said tangs, and successively repeating the above steps to form a plurality of wire coils continuously interconnected by lead wires each having a twisted wire loop connection with a corresponding tang.

4,052,784

METHOD FOR THE MANUFACTURE OF A TUBULAR CONDUCTOR SUITABLE FOR SUPERCONDUCTING CABLES

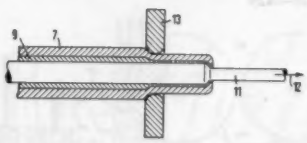
Heinrich Diepers, Erlangen-Bruck; Otto Schmidt, and Horst Musebeck, both of Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Feb. 26, 1974, Ser. No. 446,096

Claims priority, application Germany, Mar. 9, 1973, 2311835

Int. Cl.[2] H01L *39/14;* **B21C** *23/24*

U.S. Cl. 29—599 **20 Claims**



1. A method for manufacturing a tubular conductor consisting of a niobium layer and a copper layer, which conductor is particularly suited for a superconducting cable, comprising the steps of:

a. plating one cylindrical surface of a seamless tube of electrolytic copper with a layer of niobium by fusion electrolysis;

b. applying a lubricating coating to the niobium layer and copper surface;

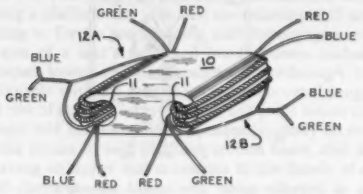
c. drawing the tube so formed in several cold drawing passes to reduce the outside diameter and the wall thickness of the tube and the niobium layer in order to form a longer tube.

4,052,785

METHOD OF MAKING A TRANSFORMER ASSEMBLY

John D. Duncan, Bozeman, Mont., assignor to Dana Corporation, Toledo, Ohio

Filed Nov. 28, 1975, Ser. No. 635,820
Int. Cl.[2] H01F *41/08*
U.S. Cl. 29—605 3 Claims



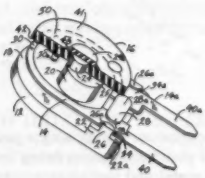
1. A method of forming a transformer assembly comprising: providing a single core of magnetic material, said core defining two apertures therethrough, said apertures being symmetrically located with respect to each other and with respect to said core; winding a coded three wire cable through each of said apertures providing two ends of said cable corresponding to each aperture; and interconnecting one wire from one end of each cable with a different wire from the other end of the same cable such that diagonally corresponding ones of the wires are interconnecting whereby the transformer is symmetrical.

4,052,786

METHOD OF MAKING A VARIABLE RESISTANCE CONTROL

James N. Hufford, Elkhart, Ind., and John Zdanys, Edwardsburg, Mich., assignors to CTS Corporation, Elkhart, Ind.

Division of Ser. No. 484,599, July 1, 1974, Pat. No. 3,950,722.
This application Apr. 5, 1976, Ser. No. 673,672
Int. Cl.[2] H01C *17/02, 17/28*
U.S. Cl. 29—610 R 11 Claims



1. A method of making a variable resistance control comprising the steps of:

a. providing an electrically nonconductive frame of plastic material and carrying a shaft,

b. aligning a pair of conductive members on the frame, one of the frame and the conductive members being provided with a pair of posts,

c. securing the conductive members to the frame by deforming the posts, and

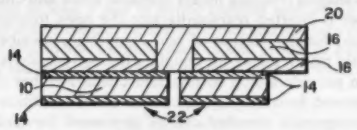
d. rotatably securing a base having an aperture, a collector path, and a resistive path to the shaft by deforming the end of the shaft, the resistive path wipably engaging one of the conductive member, the collector path wipably engaging the other of the conductive members, and the shaft being received in the aperture of the base.

4,052,787

METHOD OF FABRICATING A BEAM LEAD FLEXIBLE CIRCUIT

Joseph M. Shaheen, La Habra, and John Simone, Stanton, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 18, 1975, Ser. No. 641,806
Int. Cl.[2] H05K *3/30*
U.S. Cl. 29—626 10 Claims



1. A method for fabricating beam lead interconnect circuits comprising the steps of:

processing a metal layer to form a pattern of beam lead interconnections thereon;

coating a layer of insulation material on a first surface with an adhesive;

forming at least one cavity through said insulation layer for supporting a device;

coating said insulation layer on a second surface with a plastic material;

laminating at a suitable temperature and pressure said metal layer to the adhesive coated first surface of said layer of insulation material and substantially, concurrently forcing said plastic material into each cavity in said insulation layer to form a backing to prevent deformation of said metal layer;

etching the surfaces of said metal layer except the pattern portion thereof to form beam lead interconnections; and

removing said plastic material and leaving a cavity having said beam lead interconnections cantilevered over said cavity ready for connection to said device.

9. The method recited in claim 1 including the steps of

placing a circuit device within said cavity in the laminated composite,

placing a substrate under said laminated composite, and

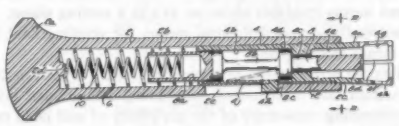
bonding said cantilevered beam leads to said circuit device.

4,052,788

TOOL FOR REMOVING A SNAP-IN BUSHING FROM A MOUNTING PANEL HOLE

Jerome K. Hastings, Sussex, and Earl T. Piber, Oconomowoc, both of Wis., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed July 6, 1976, Ser. No. 702,760
Int. Cl.[2] B25B *27/14*
U.S. Cl. 29—764 8 Claims



1. A removal tool for releasing a snap-in bushing switch having a snap-in collar from its hole in a mounting panel comprising:

an elongated compressor member having a tubular section open at its forward end and having a spring abutment at its rear end;

an elongated chuck member extending rearwardly into the open forward end of said tubular section of said compressor member and having a divided and flared, self-expanding tubular section at its forward end forming a chuck

normally projecting from said open end of said compressor member to an initial condition far enough to allow self-expansion thereof so that it is adapted to be placed about the snap-in bushing collar of the switch against the mounting panel;

a return spring within the rear portion of said compressor member forwardly of said abutment and engaging said chuck member;

and snap-in coupling means operable when said chuck member is inserted rearwardly into the open forward end of said tubular section of said compressor member against said return spring for coupling the two members together to provide a stop so that said chuck member cannot be moved forwardly from its said initial condition but said compressor member can be depressed forwardly along said chuck member against the force of said return spring to cause its tubular forward section to squeeze said chuck and the snap-in bushing collar therewithin small enough to slip back through the hole in the mounting panel for removal of the switch.

4,052,789

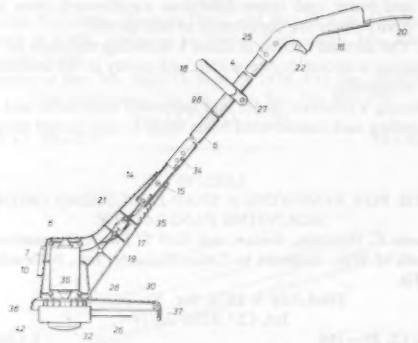
ROTARY CUTTING ASSEMBLY

George Charles Ballas, Sr., Houston, Tex., assignor to Weed Eater, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 746,685, Dec. 2, 1976. This application Dec. 3, 1976, Ser. No. 747,319

Int. Cl.[2] B26B *27/00*; A01D *55/18*

U.S. Cl. 30—276 **25 Claims**



1. Apparatus for cutting vegetation and the like, comprising:

head means rotatable about an axis in a cutting plane,

electrically actuated driving means for rotating said head means in said plane,

a flexible non-metallic line member having a portion coiled within said head means and having an uncoiled portion extending outwardly of the periphery of said head means in said cutting plane,

a housing supporting and enclosing said driving means,

handle means attached at one end to said housing and including a switch,

an electrical harness assembly including a full-wave rectifier connected between said driving means and said switch for actuating said driving means, and

a cutting blade associated with said housing and spaced from said axis in said cutting plane for trimming said line to a predetermined length upon actuation of said driving means.

4,052,790

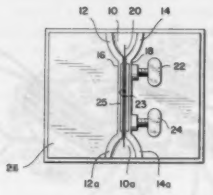
PEA AND BEAN CUTTER

Albert S. Carle, R.R. 2, Box 129 E 2, Lake City, Fla. 32055

Filed Aug. 3, 1976, Ser. No. 711,309

Int. Cl.[2] B26B *29/00*

U.S. Cl. 30—287 **5 Claims**



1. A vegetable preparing utensil having side plates comprising:

a. a pair of troughs in said side plates defined by outward bowing regions disposed at an angle to a horizonal plane at opposite ends of said side plates adapted to the lengthwise fitting therein of a vegetable;

b. a cutting blade having a cutting edge at each end protruding part way into each of said troughs;

c. means for adjusting the amount of protrusion of said cutting edges into each of said troughs; and

d. means for holding said cutting edges in an adjusted position.

4,052,791

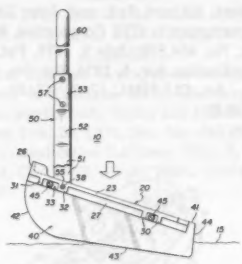
LAWN EDGE TRIMMER

Mario Anesi, Inverness, Ill., assignor to Ansan Tool and Manufacturing Co., Inc., Harwood Heights, Ill.

Filed Sept. 23, 1976, Ser. No. 722,873

Int. Cl.[2] B26B *3/00*

U.S. Cl. 30—315 **1 Claim**



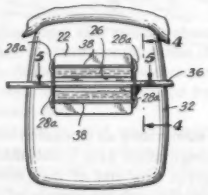
1. A lawn edge trimmer comprising a pair of platform sections; each of said platform sections being integrally formed of a single piece of metal and including a substantially flat base having a foot-receiving surface thereon and an attachment flange depending from said base along one side edge thereof, said foot-receiving surface having laterally-extending grooves formed therein, two pairs of longitudinally spaced-apart and laterally-extending ribs integral with said attachment flange and extending laterally therefrom to the other edge of said base, said attachment flange including thickened portions respectively disposed between said pairs of ribs and projecting laterally toward said other edge of said base and each being provided with a laterally-extending aperture therethrough, the ribs of each pair or ribs cooperating to define therebetween a recess extending from the corresponding thickened portion of said attachment flange to said other edge of said base, one of said ribs being enlarged and provided with a bore extending axially therethrough laterally of said base; a knife blade disposed in use between said attachment flanges and extending

therebeyond in a direction away from said foot-receiving surfaces and being provided with openings therethrough respectively alignable with said bores and apertures, said blade being coterminous with said platform sections at the front ends thereof and extending rearwardly beyond the rear ends of said platform sections; fastening members respectively extending through aligned ones of said apertures and openings for securely clamping said blade between said attachment flanges with said foot-receiving surfaces being substantially coplanar for forming a platform and with said toe-retaining wall sections cooperating to form a toe-retaining wall for engagement with the toe end of a user's foot; and handle means including a clevis-shaped lower end having holes therethrough respectively alignable with the outer ends of said bores through said enlarged ribs of said platform sections; and pivot means extending through said holes and said bores for pivotally connecting said handle means to said platform section bases, said handle means having an upper end accessible to the hands of a user with said clevis-shaped lower end being adapted in use to receive thereunder the foot of the user, whereby said knife blade may be guided by said handle means and may be driven downwardly into the lawn by the weight of a user standing on said platform.

4,052,792
ORTHODONTIC DEVICE

William Biederman, 325 Hempstead Ave., Rockville Centre, N.Y. 11570

Filed June 3, 1976, Ser. No. 692,314
Int. Cl.² A61C 7/00
U.S. Cl. 32—14 A **6 Claims**



1. An orthodontic appliance having a molded plastic base and defining an elongated arch wire slot for use in connection with orthodontic arch wire comprising a reinforcement opening, reinforcing wire disposed within said opening and having ligatable extensions disposed beyond said base in the direction of the arch wire slot, said reinforcing wire being of a shape to prevent rotation and being held in place by insertion concurrently with molding of said base.

4,052,793
METHOD OF OBTAINING PROPER PROBE ALIGNMENT IN A MULTIPLE CONTACT ENVIRONMENT

Charles Paul Coughlin, Chelsea, and Louis Henry Faure, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,537
Int. Cl.² G01B 7/00; B27G 23/00
U.S. Cl. 33—180 R **6 Claims**

1. A method of aligning a plurality of probes to a plurality of contacts arranged in a pattern on a substrate, said method comprising the steps of:

powering one of a selected pattern of probes or a like pattern of selected contacts such that upon the selected patterns being in coincidence, the plurality of probes will be in contact with predetermined contacts on the substrate;

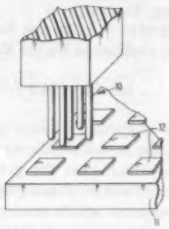
providing a circuit path through one of all of the other probes or contacts not so powered,

bringing said plurality of probes into contact at random with said contacts of said substrate, and moving one of said substrate and probes until said selected patterns coincide as indicated by a completed circuit path between said selected patterns.

6. A method of aligning a plurality of probes to a plurality of electrically conductive contacts on a substrate, said contacts on the substrate including pad like contacts adjacent to the contacts on the substrate, said method comprising the steps of:

positioning said plurality of probes approximately in the area of said contacts on said substrate;

providing at least a pair of probe clusters each being associated with a contact on said substrate and having a plurality of spaced apart probes, each of said probes of a cluster being spaced from at least its adjacent probe a distance less



than the width of the associated pad like contact which is to be contacted but greater than one half the width of said pad like contact,

providing a source of electrical power to a selected probe of each of said pair of probe clusters,

contacting said associated pad like contacts with the associated selected probes,

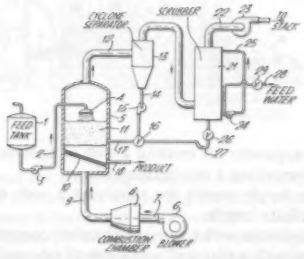
sensing whether a shorted condition exists between said selected probe and any other probe of a cluster,

and moving one of said plurality of probes and substrate until a non-shorting condition exists between the selected probe of each cluster and the associated contact thereby indicating that said plurality of probes is aligned with said substrate.

4,052,794
FLUIDIZED BED PROCESS

Neophytos Ganiaris, Riverdale, N.Y., assignor to Struthers Scientific and International Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 260,150, June 6, 1972, abandoned. This application Feb. 24, 1976, Ser. No. 660,945
Claims priority, application United Kingdom, June 18, 1971, 28754/71
Int. Cl.² F26B 3/08
U.S. Cl. 34—10 **2 Claims**



1. The process of providing product granules of a desired size in a fluidized bed dryer from an aqueous feed solution comprising the steps of:

a. passing heated air upward in a fluidized bed dryer;

b. spraying an aqueous solution of feed into the dryer forming a fluidized bed therein in which drying particles aggregate and grow into granules to fall from the fluidized bed;

c. withdrawing aggregated particles from the fluidized bed as a product;
d. recovering fines blown upward from the fluidized bed;
e. passing the fines through a water scrubber with a predominently recycled water supply to provide dust in a water solution; and
f. withdrawing dust laden water from the scrubber and adding it to the fluidized bed.

4,052,795

MALTING AT LOW MOISTURE

James Richard Allan Pollock, Reading, and Alan Aldred Pool, Camberley, both of England, assignors to Pollock and Pool Limited, Reading, England

Filed Mar. 9, 1976, Ser. No. 665,267
Claims priority, application United Kingdom, Mar. 14, 1975, 10777/75
Int. Cl.² F26B *7/00*
U.S. Cl. 34—12 **11 Claims**

1. In a method of malting a cereal grain which comprises: steeping cereal grain in water; allowing the steeped grain to germinate during which time the grain develops roots and undergoes a series of chemical and physical changes with the production of enzymes which render the grain capable of yielding a high percentage of extractable material when ground and extracted with hot water; treating the grain with gibberellic acid; exposing the grain to air; and drying the germinated grain;

the improvement which comprises:

rupturing the surface of the cereal grain without damaging the germinative ability of the grain; and

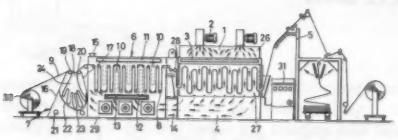
providing water during germination in an amount insufficient to allow a root growth having a dry weight equal to more than 0.59% of the dry weight of the grain if the grain were allowed to germinate for five days in the presence of air at 16° C.

4,052,796

PROCESS AND APPARATUS FOR THE CONTINUOUS FINISHING OF WEBS OF TEXTILES, ARTIFICIAL LEATHER AND THE LIKE

Hans F. Arendt, Bleichinsel, 712 Bietigheim, Germany

Continuation-in-part of Ser. No. 400,911, Sept. 26, 1973, Pat. No. 3,938,356. This application Sept. 23, 1975, Ser. No. 616,090
Claims priority, application Germany, Sept. 27, 1972, 2247320; Sept. 26, 1974, 2445915
Int. Cl.² F26B *13/12*
U.S. Cl. 34—60 **3 Claims**



1. An apparatus for treating a web of material of indefinite length comprising a combination of,

a web supply means for supplying a web of material of indefinite length,

a relaxed-state web treatment chamber comprising a base, a front wall, a rear wall and a pair of side walls fixed to the base and to each other enclosing a chamber open at a gap in the top existing between the front and rear walls, a screen arranged within the chamber to asymmetrically sag in a shape of approximately elliptical cross-section, means for introducing the web of material from the web supply means into the chamber through the gap, means for introducing a web treatment medium into the chamber and means for withdrawing the web of material from the chamber through the gap,

a flow-through reversible drum treatment chamber comprising a casing, a drum mounted for rotation within the casing, means for introducing the web received from the relaxed-state web treatment chamber into the drum, the web travelling continuously through the interior of the drum, conditioning means for controllably conditioning air and introducing the air into the drum and casing and means for withdrawing the web from the drum and casing, and

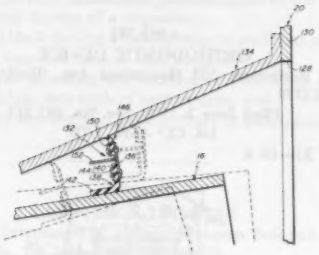
web demand means for receiving the web from the flow-through reversible drum treatment chamber and depositing the web in a easily handled form.

4,052,797

ROTARY DRUM PLENUM SEAL

Charles W. Christensen, Cedar Rapids, Iowa, assignor to Raytheon Company, Lexington, Mass.

Filed Apr. 2, 1976, Ser. No. 673,035
Int. Cl.² F26B *25/00*
U.S. Cl. 34—242 **4 Claims**



1. Apparatus comprising an elongated hollow member rotatable about its longitudinal axis, a stationary enclosure having an opening therein, one end of said member being located adjacent said opening with the interior of the member being in communication with the interior of the enclosure, the member further being angularly adjustable about an axis adjacent said one end thereof, means for providing a flow of air through said member and enclosure, a hood mounted on said enclosure around the opening therein, said one end of the rotatable member projecting freely into said hood, and seal means disposed within the hood between the hood and said end of the rotatable member for preventing passage of substantial amounts of air therebetween while permitting rotation and angular movement of the member, said hood surrounding the adjacent end portion of said rotatable member, and said seal means comprising a flexible inner annulus encircling and frictionally engaging said rotatable member, and a flexible outer annulus in slidable engagement with the surrounding inner surface of the hood.

4,052,798

AUDIO-VISUAL TEACHING SYSTEM

Shinji Tomita, Zushi, and Tsunehiro Kashima, Yamato, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 2, 1976, Ser. No. 672,970
Claims priority, application Japan, Apr. 8, 1975, 50-42528
Int. Cl.² G09B *7/04*
U.S. Cl. 35—9 A **19 Claims**

1. A system for selectively supplying information requiring independent response to plural stations whereat operators provide said independent responses, said system returning further information to said stations as a function of each response, comprising:

a television monitor at each station for displaying video picture information;

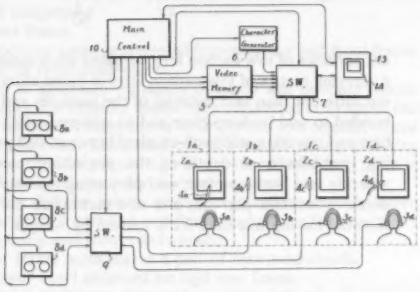
manually operable responding means at each said station for producing said response when operated by said operator;

main storage means for storing a plurality of addressable frames of video picture signal information, each frame representing predetermined still video information;

buffer storage means having a plurality of storage channels corresponding to the number of said stations, each storage channel having a storage capacity to store a frame of video picture signal information;

first switch means intercoupled between said main storage means and said buffer storage means and selectively operable for transferring an addressed frame of video picture signal information to a selected channel in said buffer storage means;

second switch means intercoupled between said buffer storage means and said plurality of stations and selectively operable for transmitting selected frames of video picture



signal information from said storage channels in said buffer storage means to corresponding ones of said stations so as to display on the television monitors at said stations still video picture information represented by the respective transmitted frames; and

control means coupled to said main storage means and to said buffer storage means for controlling said main storage means in accordance with a produced response to address a selected frame of video picture signal information and to transmit the addressed frame to a particular storage channel in said buffer storage means as determined by the selective operation of said first switch means, and for controlling said buffer storage means to transmit the frames of video picture signal information stored in said respective storage channels to selected ones of said stations as determined by the selective operation of said second switch means.

4,052,799

MANUALLY INDEXED VISUAL TEST RECORDING APPARATUS

Vida M. Journot, 73 Stonegate Drive, Bedford, Tex. 76021

Filed Mar. 25, 1975, Ser. No. 561,917
Int. Cl.² G09B *7/00*; H03K *21/18*
U.S. Cl. 35—48 R **21 Claims**

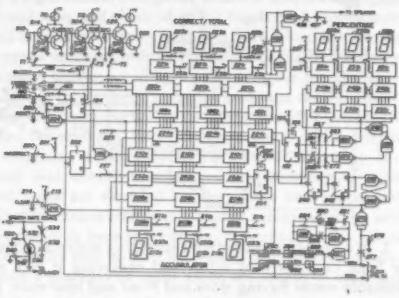
1. Apparatus for recording the performance of an individual student responding to a test environment, comprising in combination:

operator control means including first and second selector means, with said first selector means being for generating a "correct" signal in response to an operator's manual input that the student has given an acceptable reply, and said second selector means being for generating an "incorrect" signal in response to an operator's manual input that the student has given an unacceptable reply,

first counter means connected to said first selector means to record the quantity of "correct" signals generated by said first selector means,

second counter means responsive to said first and second selector means to record the quantity of both "correct" and "incorrect" signals which are generated by said first and second selector means, so as to count the total number of input signals,

first circuit means responsive to said first and second selector means to also record the quantity of "correct" and "incorrect" signals which are generated by said first and second selector means,



display means for continuously indicating the percentage of "correct" signals generated for the recorded quantity of both "correct" and "incorrect" signals, and

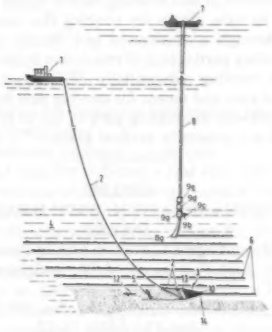
second circuit means response to said first counter and connected to said first circuit means and said display means for transferring to the display means from the first circuit means a signal representing the percentage of "correct" signals.

4,052,800

SYSTEM FOR GATHERING SOLIDS FROM THE OCEAN FLOOR AND BRINGING THEM TO THE SURFACE

Alfred Fuhrboter, and Manfred Mittelstadt, both of Braunschweig, Germany, assignors to Salzgitter AG, Germany

Filed July 31, 1975, Ser. No. 600,853
Claims priority, application Germany, Aug. 1, 1974, 2437071
Int. Cl.² E02F *3/88*
U.S. Cl. 37—58 **9 Claims**



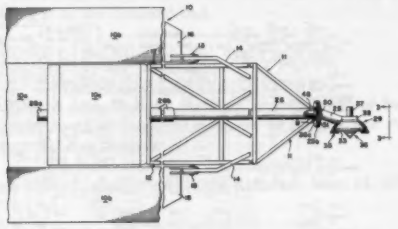
7. A method for gathering nodulous mineral deposits disposed on the ocean floor, comprising the steps of dragging a collecting means across a strip of the ocean floor in a randomly selected direction, the collecting means being adapted to receive solids, including nodulous mineral deposits, strewn over the strip of the ocean floor; collecting and concentrating substantially all the solids, including the nodulous mineral deposits, received by the collecting means into an extended pile on the strip of the ocean floor, the width of the extended pile being less than the width of the strip; and thereafter drawing the nodulous mineral deposits from the extended pile and driving them up to the surface of the water.

4,052,801

DREDGING SYSTEM AND METHODS OF DREDGING

Leward N. Smith, Millbrook Road, Rte. 1, Remus, Mich. 49340

Filed Apr. 28, 1976, Ser. No. 681,275
Int. Cl.[2] E02F 3/92
U.S. Cl. 37—64 14 Claims



1. In a dredging system for excavating material from the bed or bank of a body of water and removing it as a slurry: a floatable vessel having sides and front and rear ends; a cutterhead supporting, longitudinally forwardly extending boom mounted thereon; a suction creating means carried by said vessel; a housing mounted for pivotal movement on said boom about the generally longitudinal axis of said boom and defining a material collecting compartment; a suction conduit, connected with the suction creating means, leading from said compartment to deliver slurry therefrom to a location remote from the cutterhead housing; the housing being imperforate except for an opening leading to said suction conduit and a side opening, a sidewisely disposed rotary disc supported for rotation about an axis generally transverse to said longitudinal axis and having an inner face closing said side opening and defining one wall of said compartment, and an outer knife mounting face extending generally parallel with the boom, the disc having generally radially extending openings removed from its said axis and leading from its outer face to its inner face; and knives mounted at said openings having edges extending generally linearly generally parallel with the outer face of the disc along the openings to cut material and propel it through the openings to the inner face of the disc and the material collecting compartment of said housing; motor means for rotating the disc about its axis; means for rotating the housing, including the disc, through a downward and thence upward path of travel including partial arcs of revolution in the same direction of rotation totaling substantially 180° about said generally longitudinal axis; and means for moving said boom and cutterhead in a sidewise excavating path of travel in which the disc is disposed in a generally vertical plane.

4,052,802

GROUND-ENGAGING TOOL WITH WEAR-RESISTANT INSERT

Lowell J. Moen; Eugene L. Helton, both of Peoria, and Chris R. Straesser, East Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 23, 1976, Ser. No. 660,752
Int. Cl.[2] A01B 35/22
U.S. Cl. 37—141 R 8 Claims

1. A ground-engaging tool comprising:

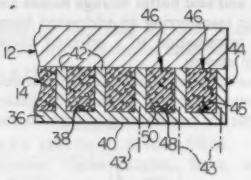
a blade including a load carrying front face, a ground-engaging bottom surface, and a rear face; and

wear-resistant means for extending the wear life of the tool including a back-up plate disposed in rearwardly spaced relation from said rear face and adjacent said bottom surface, a wear-resistant material bondably sandwiched between said plate and said rear face, and a plurality of substantially parallel ribs which extend through said wear-resistant material and are rigidly secured to said plate and said rear face of said blade, said ribs being oriented in vertical planes parallel to a normal direction of linear travel of the tool, to minimize in use spalling of said wear-resistant material.

6. A wear-resistant insert for a ground-engaging tool comprising:

a back-up plate of low carbon steel with a plurality of projecting members of low carbon steel extending generally normally therefrom; and

a composite material including a plurality of abrasive-resistant particles of low carbon ferrous-based alloy material in a carrying matrix of low carbon ferrous-based alloy material different than said material of the particles and being bonded to said back-up plate and to said projecting members and covering said back-up plate between said projecting members to a depth of the projecting members, wherein said back-up plate, said projecting members, said abrasive resistant particles and said matrix are each of a material having less than 0.2% carbon by weight.

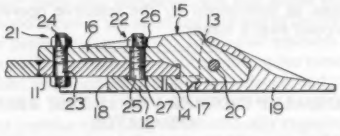


4,052,803

LOADER BUCKET CUTTING EDGE WITH RECESSED BOLT STUDS AND METHOD

William E. Lanz, Joliet, and Visvaldis A. Stepe, Willow Springs, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 18, 1976, Ser. No. 733,689
Int. Cl.[2] E02F 9/28
U.S. Cl. 37—141 T 16 Claims



1. A work implement comprising

an elongated and flat general purpose edge disposed forwardly thereon,

a flat cutting edge mounted beneath said general purpose edge to be substantially coextensive therewith and having a forward edge,

a plurality of fastening means, releasably securing said cutting edge to said general purpose edge, comprising a plurality of fastening studs each having a lower end thereof secured on an upper side of said cutting edge and extending upwardly through a hole formed through said general purpose edge and a nut threadably mounted on an upper end of each stud and

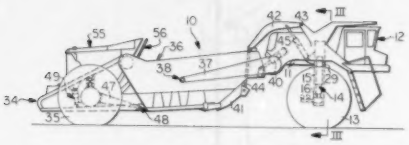
means defining a recess in at least one of said general purpose edge and said cutting edge, said recess having a lower end of each fastening stud disposed therein.

4,052,804

NON-ARTICULATED SCRAPER ARRANGEMENT

Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 17, 1976, Ser. No. 667,768
Int. Cl.[2] E02F *3/62*
U.S. Cl. 37—129 12 Claims



1. A non-articulated scraper disposed on a longitudinal axis thereof comprising

a front frame,

an operator's station mounted forwardly on said front frame,

a pair of front roadwheels,

a pair of generally vertically disposed and laterally spaced suspension cylinder means each connected at its upper end to said front frame and at its lower end to a respective one of said roadwheels, said cylinder means acting as a king pin means for permitting said front roadwheels to pivot in a horizontal plane for steering purposes,

steering linkage means pivotally interconnected between said front frame and said front roadwheels for selectively pivoting said front roadwheels,

a rear frame mounted on a pair of rear roadwheels,

a scraper bowl mounted on said rear frame,

a pair of draft arms disposed on either side of said scraper bowl and pivotally interconnected directly to said scraper bowl and to said front frame, and

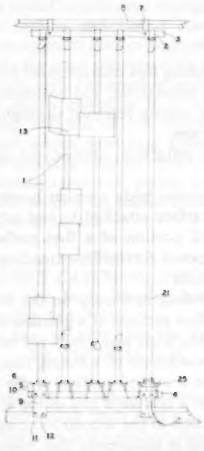
actuating means interconnected to said scraper bowl and to said front frame for selectively raising and lowering said scraper bowl relative to said front frame.

4,052,805

CARD AND BULLETIN DISPLAYER MOUNTING ON WALL OR DOOR

Glenn James Potter, 1332 S. Hope St., No. 302, Los Angeles, Calif. 90015

Filed Nov. 26, 1975, Ser. No. 635,669
Int. Cl.[2] G09F *1/10*
U.S. Cl. 40—124 6 Claims



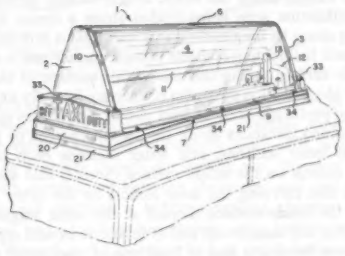
1. Structures for displaying cards and bulletins comprising the combination of: a plurality of common sturdy tapes on which a plurality of cards are affixed each of said tapes is stretched out and held in a recoverably displaceable manner in a substantially vertical plane; a first fixation means mounted on a building comprising a crossbar holding a first end of at least one of said tapes; a linkage means holding said one tape at its second end, said linkage means comprising: a double hook member having hooks adjacent each side of said tape and joined by a rigid medial elongation member adapted to engage and hold said tape, and a pair of elastic bands each looped over one of said hooks and over a crossbar rigidly joined to a second fixation means mounted on said building said elastic bands are held in tension between said hooks and crossbar thereby causing said linkage to resiliently stretch said tape tautly; adjustment means for changing and maintaining the effective length of said tape between said first fixation means and said linkage means comprising a plurality of buckles for adjusting and maintaining said effective lengths of said plurality of tapes when said tapes are doubled back to form end loops; said second fixation means comprising spacer means whereby said tapes are held away from said building far enough that a jaw of a common stapler may be inserted behind said tapes for removably affixing a plurality of cards along the length of each said tape.

4,052,806

DISPLAY DEVICE WITH ADJUSTABLE ATTACHMENT MEANS

James Rembrandt George, Garden City, N.Y., assignor to Vango Media, Inc., New York, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,275
Int. Cl.[2] E05D *15/20*
U.S. Cl. 40—129 C 13 Claims



1. A display device for displaying information bearing materials for viewing comprising:

a. a first end member defining a front end;

b. a second end member defining a rear end, each said first and second end members including a surface for supporting said information bearing materials, sections of which cooperate with end illuminating means for illuminating said sections independently of each other such that as one section is illuminated, another section is generally unaffected by the section which is illuminated;

c. a pair of side members supported between said first and second end members, said side members disposed at an angle one to the other and also having a surface for supporting said information bearing materials, and each said side surface between an upper and lower end being generally outwardly convex;

d. a bottom member secured to each said side member and to said first and second end member;

e. a top portion likewise secured thereby defining a substantially closed member in said display device;

f. illuminating means disposed in said chamber comprising a substantially continuous source of illumination extending substantially from said front end to said rear end and located substantially midway between said other members and top portion for rear illumination by substantially an

equal amount of lumens every portion of said side surfaces for ease in viewing the same and said information bearing materials thereon from a multitude of attitudes; and

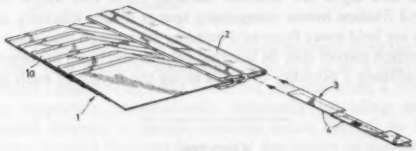
g. attachment means for attaching said display device to the roof of a vehicle, said attachment means being carried by said bottom member.

4,052,807

DATA CARRIER HOLDER WITH IDENTIFICATION STRIP

Dieter Klaus-Jurgen Schweinsberg, Lautertal-Unterlauter, Germany, assignor to Eichner Organisation KG, Coburg, Germany

Filed May 18, 1976, Ser. No. 687,597
Claims priority, application Germany, Feb. 2, 1976, 2603793
Int. Cl.[2] B42F *21/00*
U.S. Cl. 40—359 **2 Claims**



1. A holder for the filing of data carriers such as documents or film sheets which comprises a relatively flat member having a plurality of separate compartments for receiving the data carriers; one of the edges of said relatively flat member being formed along its entire length with a transparent material in the shape of a hollow profile edge; and an identification strip positioned within said hollow profile edge and of a sufficient length to extend along the entire length of said profile edge; said identification strip being folded along a center fold line extending along its longitudinal axis such that it is divided into halves, each half having a visible outside surface and a non-visible inside surface facing the non-visible surface of the other half, said identification strip also containing laterally extending separating perforations on at least one of said halves spaced at predetermined distances along the length thereof to provide individual letter sections, said letter sections each carrying different indicia on the inside surface thereof, said identification strip also carrying the same indicia on the other divided halve of the inside surface thereof at the same length therealong and at the same level, and at least one of said separating perforations being cut and at least one of said letter sections being folded towards the outside so that the indicia on the folded letter section is made visible as well as the corresponding indicia on the other divided half of the identification strip through the hollow profile edge.

4,052,808

COLLAPSIBLE FISH SPEAR

Philip G. Crabtree, 5820 16th NE., Seattle, Wash. 98105

Filed Sept. 7, 1976, Ser. No. 720,899
Int. Cl.[2] A01K *81/04*
U.S. Cl. 43—6 **4 Claims**

1. A collapsible fish spear for use in underwater sports fishing comprising:

a series of lengths of rod adapted to telescopically interlock together in end-to-end relation into a single length of rod, including a forward length having a spear unit extending therefrom, a terminal length and one or more intermediate lengths;

elastic means secured at one end to the forward length, at the other end to the terminal length and, extending under tension through the intermediate lengths; and

an elastic loop secured to the spear for propelling the spear through water when tensioned by the holder and released, the spear transportable in collapsed condition with the lengths of rod pulled apart and held substantially parallel to each other, the lengths of rod, when released, joining together in end-to-end relation to form a single length of

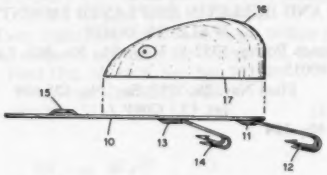
rod due to the tension exerted thereon by the elastic means.

4,052,809

FISHING LURE

Paul W. Reinhardt, Rte. No. 4, Box 355, Kingston, Tenn. 37763

Filed July 30, 1976, Ser. No. 710,316
Int. Cl.[2] A01K *85/00*
U.S. Cl. 43—42.22 **4 Claims**



1. An artificial fishing lure characterized by adjustable vertical and horizontal instabilities, and automatically-compensating lateral stability, during retrieval through water by an angler, which comprises:

a planar, highly reflective, nonbuoyant spoon of uniform thickness;

a streamlined buoyant body member having a planar lower surface, said surface attached to and substantially covering a rearward portion of a first surface of the spoon leaving an exposed forwardly-extending planar bill portion of the spoon;

a first loop extending upwardly on the bill portion of the spoon on the first surface, at a position substantially midway between the body and a forward end of the bill portion, for the attachment of a fishing line;

a second loop on a second surface of the spoon extending downwardly at a rearward end of the spoon;

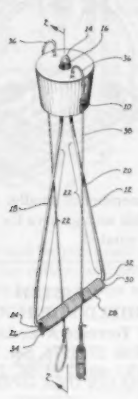
a fish hook attached to the second loop; and

wherein the spoon is sufficiently thin whereby the bill portion may be finger-manipulated by the angler for adjusting the retrieval characteristics of the lure.

4,052,810
SNELLED HOOK HOLDER

Curtis A. Stevenson, 13229 N. 41st Place, Phoenix, Ariz. 85032

Filed Aug. 19, 1976, Ser. No. 715,912
Int. Cl.[2] A01K *97/06*
U.S. Cl. 43—57.5 R 5 Claims



1. A device for releasably holding snelled fish hooks, each fish hook having a leader extending therefrom, said device comprising in combination:

a. a hook holder means for releasably receiving the point of each fish hook;

b. coil spring means for compressively engaging the leader of each hook attached to said hook holder means intermediate adjacent coils of said coil spring means, said coil spring means including a longitudinally extending internal channel;

c. a spacer member for maintaining said coil spring means in spaced relationship to said hook holder means, said spacer member comprising:

i. first and second arm means extending from said hook holder means;

ii. first leg means extending from said first arm means in a first direction through said channel of said coil spring means and second leg means extending from said second arm means in a second direction through said channel of said coil spring means, whereby, said first and second leg means longitudinal segregate said coil spring means into halves and permit insertion of different leaders from opposed sides of said coil spring means and intermediate the same adjacent coils without having the leaders tangle with one another; and

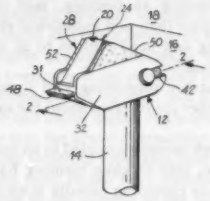
iii. first bend means extending from said first leg means for engaging one end of said coil spring means and second bend means extending from said second leg means for engaging another end of said coil spring means, whereby, said coil spring is maintained upon said first and second leg means intermediate said first and second bend means.

4,052,811
INSECT CATCHING DEVICE

Esther B. Shuster, and Jacob Shuster, both of 1904 Reedie Drive, Silver Spring, Md. 20902

Filed Aug. 16, 1976, Ser. No. 714,346
Int. Cl.[2] A01M *1/16*
U.S. Cl. 43—136 8 Claims

1. An insect catching device, comprising a rigid body, a resilient support projecting from said rigid body, a flexible sheet of material having a tacky surface, means anchoring said flexible sheet to the rigid body in overlying relation to said resilient support with a portion of the tacky surface exposed thereon, said portion of the exposed tacky surface projecting from the rigid body on the resilient support for contact with insects, said flexible sheet being an elongated adhesive tape

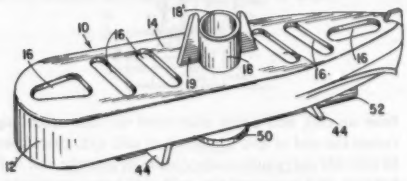


having a non-adhesive backing surface in contact with the resilient support.

4,052,812
TOY OBJECT THAT REPEATEDLY SUBMERGES AND RISES IN THE WATER

Sam Kupperman, Chicago, and Dennis I. Kupperman, Glenview, both of Ill., assignors to R B Toy Development Co., Skokie, Ill.

Filed May 25, 1976, Ser. No. 689,941
Int. Cl.[2] A63H *23/04*
U.S. Cl. 46—94 11 Claims



9. A toy object that repeatedly submerges and rises in water, comprising a body having only one chamber therein and a pivot member extending outwardly from said body, a cap having an aperture therein for sealing said chamber and providing communication between the water and said chamber through said aperture, a bubble retaining chamber separate from said body for accommodating a gas bubble during the growth thereof, and a ballast which in combination with said body provides an average density greater than water, said body and pivot member and ballast cooperating to ensure said toy object during operation thereof remains substantially submerged, whereby said toy object with a gas producing material in said chamber sealed by said cap sinks in water until a bubble in said retaining chamber formed by coaction of water and the gas producing material in said retaining chamber is sufficiently large to cause said toy object to rise until said pivot member breaks the water surface permitting said toy object to pivot about said pivot member releasing the gas bubble resulting in said toy object sinking.

4,052,813
ANIMATED TOY

Philip Warren Crain, Redondo Beach; Otto Leonhard Gabler, Lawndale, and Eugene Joseph Kilroy, Jr., Inglewood, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Nov. 10, 1976, Ser. No. 740,505
Int. Cl.[2] A63H *11/00*
U.S. Cl. 46—119 9 Claims

1. An animated toy FIGURE which comprises:

a hollow torso portion having a passage therethrough;

a head portion;

an elongated hollow cylindrical support member extending through said torso portion, said support member having

an arcuate slot through a cylindrical wall thereof extending partially about the axis of said support member;

said support member further containing a base portion at its lower end having an opening, said opening being of smaller diameter than said cylindrical portion;

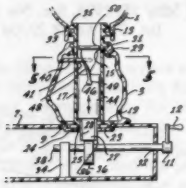
means attaching said head portion to an upper end of said cylindrical member;

means for rotatably supporting said torso portion to said support member for rotation about the axis of said support member;

a protruding web member coupled to an inner surface of said torso portion, said forklike member having two spaced pronglike ends extending radially inwardly;

plunger means, said plunger means having a small diameter elongate first portion extending through said opening in said base member, and an elongate larger second portion received within said cylindrical member; said plunger means adapted for reciprocal movement along the axis of said support member;

a cylindrical passage through said larger plunger portion transverse the axis thereof at a predetermined distance



from an end, and a slot transverse the axis extending between the end of said plunger and said cylindrical passage to provide entry into said cylindrical passage and define a keyhole-like cross-section, said slot being narrower than the diameter of said passage;

an elongate web member of relatively stiff material, said web member being formed into a twisted geometry to form a twist about its axis; a first pin attached axially to one edge end of said web and a second pin attached axially to the other edge end of said web, one of said pins being fitted within the passage in the end of said plunger means with said web member extending through said slot, whereby said web is carried by said plunger and extends along the axis of said support member; said forklike member extending through said arcuate slot with the prongs of said forklike member straddling said web in a direction transverse the axis of said web, whereby reciprocal movement of said plunger forces the surface of said striplike member to engage and rotate said forklike member about the axis of said plunger and the carried torso portion similarly rotates.

4,052,814

HOOP GUIDE ROD AND HOOP ROLLING GAME APPARATUS

Steve Hall, R.R. No. 2 Box 225, Walton, Ky. 41094

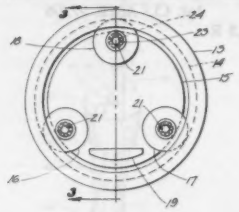
Filed Mar. 22, 1976, Ser. No. 669,157

Int. Cl.[2] A63H *33/02*

U.S. Cl. 46—220 **5 Claims**

5. In a game apparatus of the type comprising a circular hoop and a rod for rolling and guiding said circular hoop, the improved hoop construction comprising:

a. a circular rim having an annular groove extending circumferentially about the inside diameter thereof; and



b. a disc-shaped member of smaller dimensions than said rim and seated within said groove for travel thereabout as said circular rim is rotated.

4,052,815

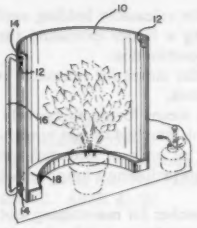
MIST SHIELD FOR HOUSE PLANTS

Karen Clark, 18037 Torrence Ave., Lansing, Ill. 60438

Filed Feb. 27, 1976, Ser. No. 662,225

Int. Cl.[2] A01G *25/00, 25/14, 1/00*

U.S. Cl. 47—1 R **1 Claim**



1. A plant mist shield or guard comprising a semi-cylindrical body portion of approximately 180° and open at the top, a trough, closed at its ends, provided and encompassed by the lower edge of said body portion, openings at the upper and lower corners of each end of said body portion, and a resilient handle having ends fitting the openings at either end of said body portion and which may be removably sprung into place in said openings, whereby said shield or guard may be manually placed or held behind a plant while misting or spraying the same, to catch any fluid which passes through the plant and deposits on the shield or guard, and runs down into the trough.

4,052,816

WINDOW STAND FOR PLANTS

Frank Perez, 661 2nd Place, Garden City South, N.Y. 11530

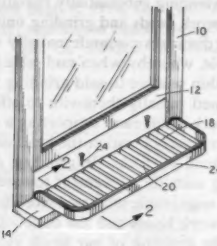
Filed Apr. 2, 1976, Ser. No. 673,213

Int. Cl.[2] A47G *7/00;* **A01G** *9/02*

U.S. Cl. 47—40 **6 Claims**

1. A window stand for potted plants comprising an elongated shelf member bounded by an outside longitudinal edge, an inside longitudinal edge, and two ends, the shelf member being formed into alternating ridges and valleys extending transversely between said inside and outside longitudinal edges, the tops of the ridges lying in a common plane, and the bottoms of the valleys being inclined with respect to said plane downward from the inside edge to the outside edge of the shelf member; and a continuous upright flange formed integrally with the shelf member, the flange enclosing the inside edge and the two ends of the shelf member and extending above the plane of the ridge tops, and the flange having a lower edge at each of said ends adapted to support the shelf member on an inside horizontal sill of a window with the plane of said ridge tops parallel to and spaced above the plane of the sill and with

the outside edge of the shelf aligned with the outside edge of the sill adjacent to the inner face of a window sash, whereby potted plants placed on the shelf will stand upright on the ridge



tops without tilting and will be protected by the flange from falling off the shelf, and the valleys will provide parallel drainage paths for excess water from such pots to the outdoors over the edge of the sill.

4,052,817

PROCESS FOR STORING AND RECOVERING PLANT TISSUE

Michael Seibert, Lynnfield, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Continuation-in-part of Ser. No. 660,289, Feb. 23, 1976, abandoned. This application Oct. 12, 1976, Ser. No. 731,146
Int. Cl.[2] A01G *1/00*
U.S. Cl. 47—58 **5 Claims**

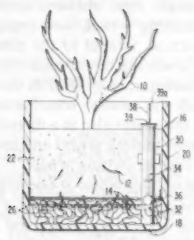
1. A process for providing herbaceous plants which comprises cold treating a donor herbaceous plant without damaging the meristematic tissue of the plant, excising the meristematic tissue of the donor plant, placing the tissue in a composition comprising a rinsing solution and a cryoprotectant, rapidly freezing the tissue and composition to a temperature below about −70° C, thawing the tissue and composition at an average warming rate of at least about 24° C/min when the tissue is at a temperature between about −70° C and about −10° C and exposing the thawed tissue to an environment of temperature, light, humidity and growth medium which promotes growth of the tissue to a mature plant.

4,052,818

METHOD AND APPARATUS FOR CONTAINERIZING PLANTS WITH A SELF-WATERING SYSTEM

Mary L. Hagerty, 10 1/2 LeGare St., Charleston, S.C. 29401

Continuation-in-part of Ser. No. 566,138, April 8, 1975, abandoned. This application July 6, 1976, Ser. No. 702,445
Int. Cl.[2] A01G *27/00*
U.S. Cl. 47—81 **12 Claims**



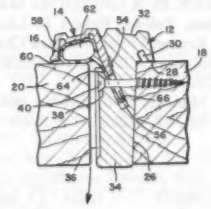
1. A planter combination including a container having bottom and upstanding side walls defining a space for receiving a plant and growing mediums, a coarse growing medium located in the bottom of the container and evenly distributed throughout to define a horizontal plane at the top of the coarse growing medium, a screen located in the container in said horizontal plane and being supported by said coarse growing medium and dividing the container into upper and lower compartments with the coarse growing medium located in the lower compartment, a fine growing medium located in the container in the upper compartment and being supported by said screen and ultimately said course growing medium, a watering tube extending generally vertically in the container through the upper and lower compartments and through said screen and having an open upper end and outlet means in a lower end portion for introducing water into the lower compartment, a float located in the passage of the watering tube, said float including a float member and a stem fixed to the float member and projecting upwardly therefrom in the passage of the watering tube, and indicia means on an upper end portion of the stem cooperable with the upper end of the watering tube for indicating when the lower compartment is either empty of water, or contains a maximum predetermined desired level of water situated adjacent to but spaced below said screen to prevent capillary action through said screen, or an excessive level of water above said maximum predtermined desired level, and wherein said indicia means includes a first mark located on the stem to lie generally at the level of the open end of the watering tube when the water in the lower compartment reaches said maximum predetermined desired level spaced below the screen, a second mark on the stem above said first mark adapted to lie generally at the level of the open end of the watering tube when the second compartment is empty of water.

4,052,819

DOUBLE DOOR ASTRAGAL

Jerome K. Beischel, Cincinnati, and William M. Bursk, Middletown, both of Ohio, assignors to Pease Company, Fairfield, Ohio

Filed Jan. 17, 1977, Ser. No. 764,899
Int. Cl.[2] E06B *7/16*
U.S. Cl. 49—368 **11 Claims**



1. An astragal for use with a double door installation including an active door and an inactive door having substantially abutting generally vertical edge portions, comprising:

rigid support means securable to said vertical edge portion of said inactive door and extending substantially the entire height of said door for sealingly engaging said door;

rigid cover means extending for substantially the entie length of said support means and releasably securable to said rigid support means in a plurality of positions for engaging said vertical edge portion of said active door along its height when said doors are in abutting relation; and

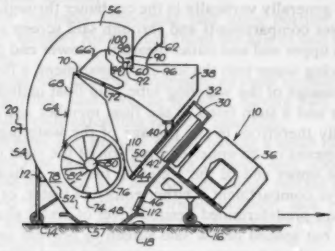
flexible sealing means mounted on said cover means and disposed between said cover means and said vertical edge portion of said active door for sealingly engaging substantially the entire height of said edge portion of said active door when in said abutting relation.

4,052,820

PORTABLE SURFACE TREATING APPARATUS

John C. Bergh, Elkhart, Ind., assignor to Wheelabrator-Frye, Inc., Hampton, N.H.

Filed Jan. 21, 1976, Ser. No. 651,183
Int. Cl.² B24C 3/00
U.S. Cl. 51—423 **13 Claims**



1. A portable apparatus for treatment of horizontally disposed surfaces comprising:

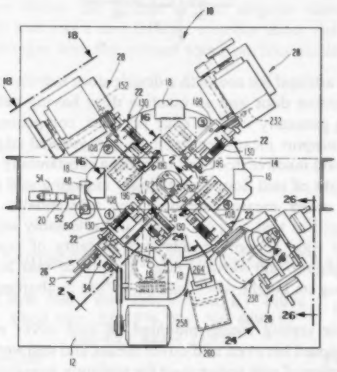
1. a housing:
2. means on said housing above the surface for projecting abrasive particles downwardly onto the surface at an angle with the surface:
   2*a*. a hopper on said housing for feeding abrasive particles to said projection means:
3. a rebound corridor in said housing extending angularly upwardly from the surface into which the abrasive particles rebound upon striking said surface;
4. means on said housing at the end of the rebound corridor for returning abrasive particles passing through the corridor to the hopper; and
5. means extending into the rebound corridor for a short distance from the wall of the corridor for intercepting abrasive particles which do not possess sufficient kinetic energy to rebound through the corridor to prevent return of said abrasive particles to the surface.

4,052,821

AUTOMATIC BUR GRINDING MACHINE

William McCandless, Toledo; Robert F. Leu, Delta, both of Ohio; Ernest A. Kroder, Felton, Pa., and Charles J. Tomecek, Curtice, Ohio, assignors to Dentsply Research & Development Corporation, Milford, Del.

Filed Mar. 15, 1976, Ser. No. 666,848
Int. Cl.² B24B 3/02, 3/60
U.S. Cl. 51—53 **23 Claims**



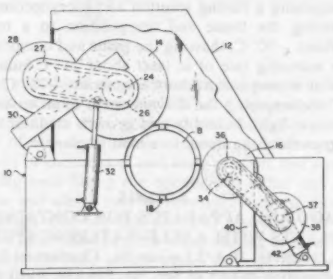
1. A machine for grinding a multi-tooth bur automatically and comprising in combination, a base, a table supported for rotation about an axis perpendicular to said table, a plurality of grinding units supported upon said base adjacent the periphery of said table, a plurality of work heads mounted upon said table and having axes extending substantially radially from the axis of said table, said work heads and grinding units being spaced substantially even distances circumferentially around the periphery of said table, whereby when said table is positioned in operative relationship relative to said grinding units said work heads will be aligned radially therewith to effect grinding of bur blanks, said work heads each supporting a collet arranged to securely and accurately position the head of a bur blank in position to be ground by rotatable grinding discs supported upon said grinding units for movement toward and from said blanks, and means engageable with said work heads and operable to move said work heads and the collets thereon radially outward during the grinding of bur heads supported by said collets at said grinding units, means operable automatically to index said work heads and collets when positioned adjacent said respective grinding units to grind a series of circumferentially arranged grooves in the heads of said burs to form corresponding teeth thereon, and power means connected to said table and operable to advance said table and the work heads supported thereby sequentially and respectively to said grinding units, whereby a plurality of burs are ground simultaneously by said machine.

4,052,822

METHOD AND APPARATUS FOR ABRASIVELY CUTTING OBJECTS

Robert F. Obear, Rolling Hills Estates, Calif., assignor to Western Gear Corporation, Everett, Wash.

Filed Mar. 15, 1976, Ser. No. 667,107
Int. Cl.² B24B 27/04, 1/02, 27/06; B23B 5/14
U.S. Cl. 51—88 **20 Claims**



1. The method of abrasively cutting elongated metal objects, comprising:

rotating the object about its longitudinal axis,

moving a used, small, rigid abrasive cutting wheel, worn from a larger cutting wheel, into engagement with the object in a direction parallel to the plane of the cutting wheel to make a scoring cut around the object,

moving a larger diameter, more flexible cutting wheel of the type from which the smaller wheel was formed into engagement with the object also in a direction parallel to the plane of the larger cutting wheel and into the scoring cut formed by the smaller cutting wheel,

rotating the larger cutting wheel at one angular velocity and rotating the smaller cutting wheel at a generally higher angular velocity to produce peripheral surface speeds at the cutting surfaces of the two cutting wheels which are the preferred speeds for the respective size abrasive wheels, and

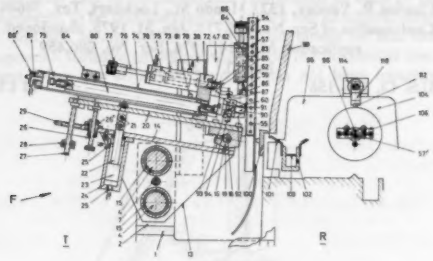
limiting the rotational speed of the object to below 4 rpm so that a deep spiral band cut is produced by the cutting wheels.

4,052,823

TAP TRANSPORT DEVICE

José Fernández Garcia, Barcelona, Spain, assignor to Ferg S.L., Vich, Spain

Filed Sept. 9, 1976, Ser. No. 722,335
Claims priority, application Spain, Dec. 29, 1975, 443918
Int. Cl.² B24B *3/18, 47/02*
U.S. Cl. 51—95 TG 15 Claims



1. In combination with a thread-cutting machine having a chuck adapted to hold a workpiece to be threaded and to rotate same about a threading axis, a tap transport device comprising:

a support frame adjacent said machine;

a carrier displaceable on said frame in a first direction transverse to said axis;

a workpiece feed gripper and a workpiece removal gripper mounted on said carrier;

means on said support frame and spaced in said first direction from said axis for holding a plurality of unthreaded workpieces and feeding same to said workpiece feed gripper;

means connected to said workpiece feed gripper for opening and closing same and thereby grasping and releasing a workpiece;

means connected to said workpiece removal gripper for opening and closing same and thereby grasping and releasing a workpiece;

means for displacing said carrier in a second direction transverse to said axis and to said first direction between a feed position with said feed gripper aligned in said first direction with said axis and a removal position with said removal gripper aligned in said first direction with said axis;

means for displacing said carrier in said first direction between an outer end position with said grippers aligned in said second direction with said means for holding and an inner end position with said grippers aligned in said second direction with said axis, whereby when in said inner end position displacement of said carrier into said feed position aligns a workpiece in said feed gripper with said axis and displacement of said carrier into said removal position aligns a workpiece in said removal gripper with said axis; and

means for displacing said carrier in a third direction generally parallel to said axis.

4,052,824

ABRADING TOOL SUCTION SYSTEM

Donald H. Hutchins, Sierra Madre, Calif., assignor to Hutchins Manufacturing Company, Pasadena, Calif.

Filed Nov. 29, 1976, Ser. No. 745,656
Int. Cl.² B24B *23/00, 55/06*
U.S. Cl. 51—170 MT 14 Claims

1. A portable abrading tool comprising:

a body to be held by a user;

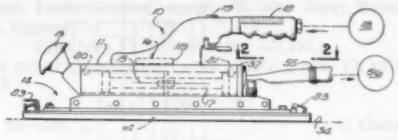
a shoe structure adapted to carry a sheet of abrading material and mounted to the underside of said body for abrading movement relative thereto, and containing passage means through which air and abraded particles are drawn from near the shoe structure;

an air motor in said body for driving the shoe relative to the body;

said body having an end surface facing in generally a predetermined direction, and said body having a flange projecting in said direction beyond said end surface at a location near but above said shoe structure;

a conduit structure carried by said body and into which a primary flow of air discharged from said motor passes, said conduit structure projecting from said body in said predetermined direction and beyond said end surface at a location spaced above said flange;

a seal part carried at the underside of said flange and free for slight upward and downward movement relative thereto



and relative to said conduit structure and containing a passage communicating with said passage means in the shoe structure to receive air and particles therefrom; said seal having an undersurface slidably engaging an upper surface of said shoe structure about said passage means and said passage to form a seal therebetween as the shoe structure moves relative to the flange and seal part;

additional conduit means extending upwardly from said seal part past said flange and connected to said first mentioned conduit structure;

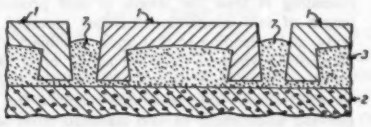
said conduit structure forming at the upper end of said additional conduit means an aspirator by which said primary flow of air induces a secondary flow of air and particles from said shoe structure and through said additional conduit means for intermixture with and discharge with the primary flow.

4,052,825

METHOD IN THE PRODUCTION OF A WALL ELEMENT AND A WALL TILE FOR USE IN CONNECTION WITH THE METHOD

Nils Östen Arnold Larsson, Linkoping, Sweden, assignor to AB Östgöga-Byggen, Linkoping, Sweden

Filed Sept. 3, 1974, Ser. No. 502,490
Claims priority, application Sweden, Sept. 3, 1973, 7311988
Int. Cl.² E04B *1/35;* E04C *1/12*
U.S. Cl. 52—98 10 Claims



1. A wall-tile of brick or other suitable wall-facing material, which is rectangular and intended to be bedded by means of mortar, together with other such tiles, in rows with joint spacing on a prefabricated wall element, wherein the tile is substantially U-shaped in cross-section having a web and legs, the front face of the tile defining the outer face of the web, while the outer sides of the legs consist of one pair of the opposing sides of the tile which slope outwardly from the front face of the tile.

4,052,826
BREAKAWAY COUPLING ASSEMBLY WITH FRACTURE-INITIATING WASHER

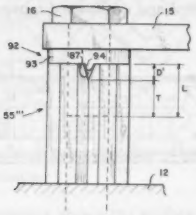
Douglas B. Chisholm, 1906 Memory Court, Vienna, Va. 22180

Continuation-in-part of Ser. No. 669,476, March 23, 1976, Pat. No. 4,007,564, which is a continuation-in-part of Ser. No. 519,670, Nov. 12, 1974, abandoned, and Ser. No. 628,641, Nov. 4, 1975, abandoned, which is a continuation of Ser. No. 539,089, Jan. 7, 1975, which is a continuation of Ser. No. 350,173, April 11, 1973, said Ser. No. 519,670, is a division of said Ser. No. 350,173.

This application July 29, 1976, Ser. No. 709,943

Int. Cl.[2] E04B *1/36*

U.S. Cl. 52—98 **10 Claims**



1. An upright standard assembly comprising the combination of

a. a generally vertical standard,

b. a base member,

c. a connection member,

d. means affixed to one of said base member or said standard for receiving said connection member to releasably attach said standard to said base member, and having a generally vertical axis of connection extending through said connection member, said means comprising

i. coupling means for receiving said connection member and for fracturing radially with respect to said axis of connection in response to an impact force applied to said standard in a generally horizontal direction generally normal to said axis of connection, said coupling means comprising a coupling body generally symmetrically disposed about any plane containing said axis of connection, said body having a first end in operative association with said base member, and a second end in operative association with said upright standard, at least one of said first and second end defining a connection member receiving opening therein, said connection member extending into said body a predetermined length along said axis of connection, said body having a plurality of grooves which define regions of minimum strength, said grooves surrounding said connection member receiving opening of said coupling body and extending from said connection member receiving end of said body parallel to said axis of connection and extending at least the length of said predetermined length of said connection member received by said body, and extending so that upon an impact force in a generally horizontal direction acting upon said standard, said coupling means will radially fracture to thereby release said connection member and thereby provide detachment of said standard from said base member, and

e. means for initiating the radial fracture of said coupling body member, said means comprising (i) at least one fracture-initiating slot formed in at least one of said grooves and extending from the end of said coupling body defining said connection means receiving opening parallel to said axis of connection, said at least one slot extending a distance less than said predetermined length of said connection member received by said coupling body, and (ii) a radial fracture-initiating washer having at least one radially extending tooth formed thereon for receipt by said at least one fracture-initiating slot, said washer disposed between one of said generally vertical standard and said base member, and said coupling body, and said connection member extending through said washer.

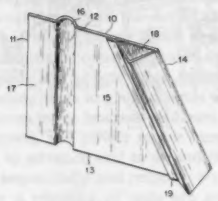
4,052,827
GROUND ANCHOR AND FOUNDATION SUPPORT

Charles R. Yancey, 1322 Hondo St., Lockhart, Tex. 78644

Continuation of Ser. No. 545,773, Jan. 31, 1975, abandoned. This application May 14, 1976, Ser. No. 686,459

Int. Cl.[2] E02D *5/74*

U.S. Cl. 52—156 **11 Claims**



1. An improved ground anchor and support device of the type having a body portion and drivable anchoring stakes affixable thereto wherein the improvement comprises: a body portion including: a centrally disposed elongate vertically positioned tubular core, the height of said core being a plurality of times its diameter, and a plurality of vertically positioned wing segments, radiating outwardly from the tubular core, in a symmetric spacing, said wing segments being each substantially quadrangular in shape, and having top, bottom, inner and outer sides; the inner side of each wing segment being fixedly secured to the periphery of said tubular core for substantially the entire height of both of said members, the wing segment having a short top side, and a relatively long bottom side, both of which extend at substantially right angles from the inner perpendicular side, so that the outer side slopes outwardly and downwardly from the top corner to the bottom corner of the wing segment, said outer side having means providing an elongate tubular socket sleeve along its marginal areas for substantially the entire length of such outer side, and the short top side being only wide enough to provide adequate room for the upper end of the tubular sleeve, each of said tubular socket sleeves forming snug and elongate support means for receiving an anchoring stake driven through the socket sleeve from top to bottom and into the ground surrounding the anchor body, so that the plurality of the stakes lend their unified strength to the anchor body so as to resist any force that tries to move the anchor from its position in the ground, and means on the central core for affixing appropriate attachment hardware to said central core for fastening structures thereto.

4,052,828
STRUCTURAL MEMBER

Robert Mancini, 8 Stepheny Drive, Toronto, Ontario M8W 2N5, and Vincenzo Gentile, 94 Bowie Ave., Toronto, Ontario M6E 2P7, both of Canada

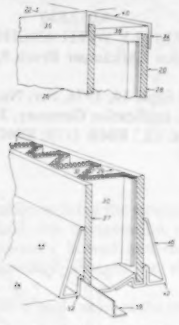
Filed Dec. 16, 1974, Ser. No. 533,147

Int. Cl.[2] E04F *19/04*

U.S. Cl. 52—242 **7 Claims**

1. The combination of an inverted U-channel ceiling member for mounting a structural member and first and second floor mounting components, said structural member comprising two sheets of material sandwiching a corrugated core between a floor and ceiling, the structural member being shorter than the distance between the floor and ceiling, said first component being adapted to be affixed to the floor, said first and second components each comprising a generally horizontally disposed component, each having inner and outer

ends, and a generally vertically disposed component attached at the outer end of each horizontal component for engagement with an outer surface of the structural member when said components are used to mount the structural member, support means secured to each horizontally disposed component for supporting the structural member, said support means comprising a crimp disposed a predetermined distance along each horizontal component from the juncture of the horizontal component and the generally vertical component, and means on the inner end of the horizontal component of each of the components to be inter-engaged to secure the structural member, said last means comprising, resilient means on said first component, forming an obtuse angle with the horizontal component when the structural member has not been mounted



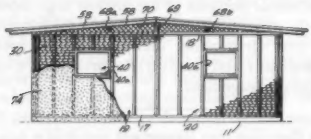
thereon, but deflected downwardly when the structural member has been mounted thereon, and engaging means on the second component, to underlie the resilient means when said resilient means is deflected downwardly by the structural member, thereby locking said second component and thus said structural member against movement until the structural member is lifted causing the resilient means to spring upwardly towards its initial position, thereby permitting the second component and thus the structural member, to be easily removed, the distance between the crimps when the resilient means of the first component overlies the engaging means of the second component, being equal to the thickness of the structural member so that the outer surfaces of the structural member abut the crimps.

4,052,829

SEMI-PREFABRICATED MONOLITHIC STEEL-REINFORCED CEMENT BUILDING CONSTRUCTION

Ward W. Chapman, 2700 W. 3rd Court, Hialeah, Fla. 33010

Filed Mar. 17, 1976, Ser. No. 667,653
Int. Cl.[2] E04B *1/00, 5/00*
U.S. Cl. 52—285 **10 Claims**



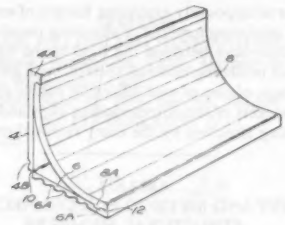
1. A monolithic steel reinforced cementacious material building structure, comprising, in combination, a plurality of outer wall panels, each wall panel comprising a plurality of formed sheet metal ribs of U-shaped cross-section arranged in spaced, parallel relation and defining a predetermined interior wall thickness, a covering of uniformly apertured sheet metal secured directly against one side of each of the ribs of said wall panels, a coating of cementacious material on the outside of said apertured sheet metal covering, a monolithic filling of cementacious material between the ribs of each of said wall panels and extending through to the other side of each of said ribs, said panels being secured in end-to-end abutting relation to define the outer periphery of a building, a plurality of formed metal steel beams spanning and secured to upper end portions of opposite side walls of said building outer periphery and arranged in spaced, parallel relation thereupon, a plurality of spaced, parallel formed sheet metal roofing rib members fixed upon and secured to said roof beams in perpendicularly crossing relation with respect thereto, a covering of uniformly apertured sheet metal secured against the underside of said roofing ribs, a coating of cementacious material on the underside of said apertured sheet metal covering said roofing ribs, a filling of cementacious material between said roofing ribs above said roofing rib apertured sheet metal covering and providing a roof deck, and an outer layer of roof sealant applied to the outside of said roof deck.

4,052,830

CORNER FILLETS

Ken Smith, Leeds, England, assignor to John Barry Potter, Leeds, England

Filed May 17, 1976, Ser. No. 687,412
Claims priority, application United Kingdom, May 17, 1975, 21097/75
Int. Cl.[2] E04C *19/02*
U.S. Cl. 52—288 **12 Claims**



1. A corner fillet composed of an elongated one-piece member that consists of a mid section and one end section on each side of the mid section, said end sections being joined to said mid section by two spaced apart hinge means that are parallel to each other and parallel to the longitudinal axis of said elongated one-piece member, said end sections being adapted to fold toward each other along said hinge lines so as to interengage along a line that is adjacent to the longitudinal outer side edges of said end sections to thereby form a corner fillet.

4,052,831

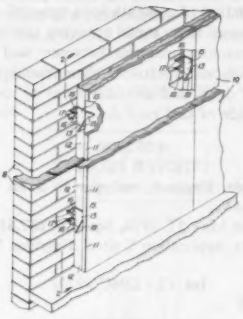
PANEL BUILDING CONSTRUCTION AND METHOD, AND CLIP

Frank William Roberts, 380 E. 7500 S., Midvale, Utah 84047; Richard Allen Roberts, 2551 Milo Way; Waldo Calvin Roberts, 4906 Regency, both of Salt Lake City, Utah 84117, and Robert Howard Blanpied, 519 Barnard, Centerville, Utah 89014

Filed June 1, 1976, Ser. No. 691,609
Int. Cl.[2] E04F *13/00*
U.S. Cl. 52—309.8 **9 Claims**

1. Panel building construction, comprising a supporting structure in the nature of a wall, ceiling, or roof structure having a panel-receiving face comprising a substantially flat surface; retainer clips for composite insultating panels each of said clips having a flat web strip and flanges extending from opposite lateral edges thereof, said flanges including a securement flange extending from one of the lateral edges of the web strip substantially perpendicular to the web strip, and a pair of flanges extending mutually oppositely from the other lateral edge of the web strip substantially perpendicular to the web strip, the securement flange having its free terminus turned outwardly of the web strip to provide an entry ramp for a receiving pocket defined between that flange and the corresponding flange of said pair of flanges; fastener means rigidly attaching the securement flanges of said retainer clips to said

flat surfaces of the supporting structure with their free termini resting on said flat surfaces and providing entry ramps; and composite insulating panels fitted into and held by the retainer clips edge-face to edge-face with the web strips therebetween, said panels each comprising a rigid board facing backed by a layer of foamed plastic insulating material adherent thereto,



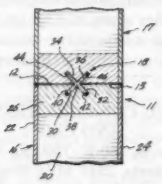
the said pair of oppositely extending flanges of each clip penetrating said insulating material of adjoining panels at and along respective interfaces between the rigid board facings and the layers of said insulating material thereof, with either said layer or said facings of one of said adjoining panels fitting into the receiving pockets of the corresponding clips and spaced from the supporting structure by the entry ramps thereof.

4,052,832

JOINT AND METHOD FOR CONNECTING STRUCTURAL MEMBERS

James W. Jungers, Arlington, and Edwin R. Hoyt, Everett, both of Wash., assignors to Pioneer Manufacturing Inc., Arlington, Wash.

Filed May 3, 1976, Ser. No. 682,566
Int. Cl.² E04B *2/32, 2/62*
U.S. Cl. 52—496 **6 Claims**



1. In combination, first and second structural members adapted to be joined and connected together along predetermined, longitudinally extending surface portions thereof, an elongate connector having a transverse section in the shape of a cross that includes first and second pairs of outwardly diverging legs joined at the center of the cross, each said member having a pair of connector receiving slots that extend both longitudinally along the respective said surface and inwardly thereof to define in a transverse section therethrough a V-shape in which the apex of the V lies generally at said surface and the legs of the V diverge inwardly therefrom, said members when arranged with said surfaces abutting and with said V-shaped slots in mutually opposed registration defining a composite slot configuration that in transverse section is the complement of the cross shape of said connector so that said connector is insertable endwise into said slots with the first pair of connector legs transversely interlocking with the slots of one of said members and with the second pair of connector legs transversely interlocking with the slots of the other member thereby connecting said members against relative displacement in the transverse plane; and

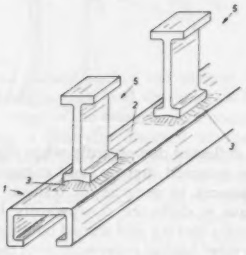
said slots being formed in said members so that said composite slot configuration defines dihedral angles between interior surface portions of the slots of opposite members that are greater than corresponding dihedral angles between the surfaces of said connector legs that seat thereagainst such that when said connector is inserted into said slots said larger dihedral angles of said interior surface portions of the slots of opposite members cause said connector legs to be wedged against said interior surface portions of such slots to clamp said members together.

4,052,833

TRACK ASSEMBLY WITH ANCHORING DEVICE

Karlheinz Beine, Am Ehrkamper Bruch 9, 4030 Ratingen, Germany

Filed Sept. 14, 1976, Ser. No. 723,282
Claims priority, application Germany, July 13, 1976, 2631396
Int. Cl.² E04B *1/38;* **E04C** *5/00*
U.S. Cl. 52—710 **13 Claims**



1. A track assembly of the type which is adapted to be permanently anchored to a concrete structural member by being at least partially embedded therein, the assembly comprising:

a track member in the form of a continuous structural shape having, as part of said shape, a rear wall defining a track member positioning outer surface and an oppositely facing inner surface;

a row of attachment apertures extending through the rear wall of the track member; and

a row of anchor lugs attached to the track member, at its attachment apertures; and wherein

the anchor lugs have shaft portions extending rearwardly away from the track member and attachment portions with which they reach through their associated attachment apertures; and

the attachment portions of the anchor lugs include integral laterally upset portions with which they engage the rear wall area surrounding their attachment apertures in a longitudinally and transversely preloaded rivet-like rigid clamping engagement.

4,052,834

METHOD OF ERECTING A ROOF STRUCTURE

Peter Edington Ellen, 16 Cornwall Avenue, Turramurra, 2074 Sydney, Australia

Filed Feb. 10, 1976, Ser. No. 656,950
Claims priority, application Australia, Feb. 13, 1975, 0598/75
Int. Cl.² E04B *1/35*
U.S. Cl. 52—741 **2 Claims**

1. A method of erecting a roof structure consisting of

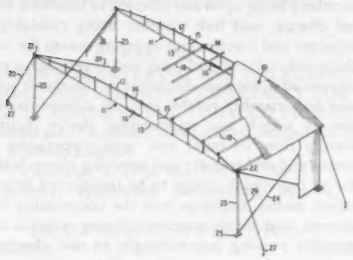
a. constructing at least two trusses each having a top compression member and a bottom tension tube connected together by vertical tension struts and joined at their ends, the top compression member being substantially straight

and the bottom compression tube being downwardly bowed,

b. interconnecting said struts by means of purlins connected thereto,

c. applying a sheet metal covering material to said purlins,

d. threading high tension steel cable through the bottom tension tubes,



e. tensioning said cables to bring the structure to a configuration in which said top compression members and the covering are upwardly bowed and the bottom tension tubes are substantially straight or slightly upwardly bowed,

f. anchoring the ends of said cables at the ends of said bottom tension tubes.

4,052,835

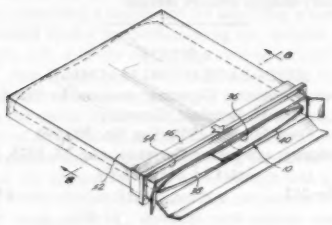
PREFORMED ONE-PIECE WALL COVERING FOR A BATHTUB RECESS

Melvin A. Stratis, 138 Beach Drive, Edmonds, Wash. 98020

Filed June 23, 1976, Ser. No. 698,951

Int. Cl.[2] B65B *1/24, 63/04, 63/08*

U.S. Cl. 53—21 FW **3 Claims**



1. A method of packaging a performed wall covering for the side and end walls of a tub-recess, comprising:

providing a one-piece wall covering that was formed from a single sheet of plastic laminate material having a decorative layer on one side and a backing layer on its opposite side, which wall covering comprises a pair of end walls which project outwardly from an interconnecting side wall, and which end walls meet said side wall at rounded corners, with the decorative layer of the plastic laminate material being on the inside of the wall covering and the backing layer being on the outside thereof,

partially folding said preformed wall covering by lapping one end wall thereof over the other end wall thereof, to produce a configuration of said wall covering in which the side wall thereof bows outwardly in one direction and the partially overlapped end walls thereof bow outwardly in the opposite direction,

substantially maintaining this configuration of the wall covering while introducing one end thereof into an open end of a normally rectangular box that is wider than the width of the partially folded wall covering and of a normal depth that is substantially smaller than the depth dimension of the partially folded wall covering,

pushing the wall covering into the box, so that the outwardly bowing side and end walls of the wall covering will in turn bow the adjacent side walls of the box outwardly,

forcing inwardly and reshaping both the side walls of the box and the side and end walls of the wall covering therein, and in so doing sliding the end walls of the wall covering in position an amount sufficient to cause the side and partially overlapped end walls of the wall covering to bow inwardly until the wall covering has assumed a new configuration which is substantially within the normal rectangular shape of the box, and

closing the ends of the box, with the frictional contact between the backing layer of the wall covering and the inner surfaces of the box in contact therewith serving to hold the wall covering in such new configuration, so that the box will retain a substantially rectangular shape.

4,052,836

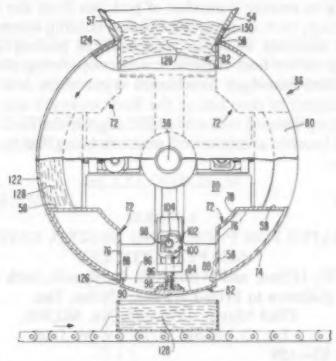
PACKAGE FILLING MACHINE AND METHOD

Richard A. Shaw, Watsonville, Calif., assignor to Richard A. Shaw, Inc., Watsonville, Calif.

Filed Sept. 15, 1976, Ser. No. 723,406

Int. Cl.[2] B65B *63/08, 3/10*

U.S. Cl. 53—25 **11 Claims**



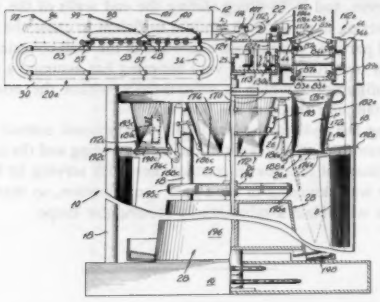
8. A method of packaging a wet, sticky, pre-cooked food product comprising: depositing a volume of the food product in a confined region having a lower opening; successively moving a plurality of spaced pockets along a first path and into registry with the opening; allowing a mass of the food product to gravitate into and substantially fill each pocket, respectively, as the same moves into registry with said opening; moving a number of spaced, open packages along a second path convergent with said first path with the speed of movement and the spacing of the packages being correlated with the speed of movement and the spacing of the pockets; holding each food product mass in the respective pocket as the latter moves away from said opening and toward said second path; progressively removing the holding action on each food product mass as it approaches and moves into registry with a respective package on said second path; depositing each food product mass in the respective package in the form of a mat as the holding action on the food product mass is progressively removed and as the food product mass is in registry with the respective package; and closing and freezing each package with the food product mass therein.

4,052,837

MULTIPLE POUCH BAGGING APPARATUS

Jerome Saintonge, 100 Cote Vertu, Apt. 907, St. Laurent, Quebec, Canada (H4N 1C7)

Filed Sept. 13, 1976, Ser. No. 722,377
Int. Cl.[2] B65B *57/10, 35/30*
U.S. Cl. 53—62 7 Claims



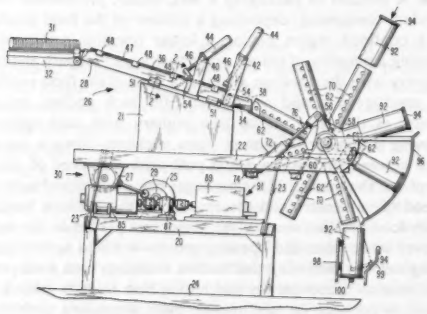
1. An apparatus comprising a frame, at least one feed conveyor for advancing liquid filled pouches, a rotary chute assembly having a plurality of chute groups with each chute group including a number of adjacent vertically extending chute sections corresponding to the number of pouches to be filled in a bag, each chute group including an outer bag holding station below the chute group, and means for opening said outer bag to receive a number of pouches from the particular chute group, each chute group in a bag holding assembly being adapted to rotate about a circular locus passing under the discharge of the feed conveyor, and cooperating means causing the feed conveyor to advance when there is a predetermined number of pouches on the feed conveyor and there is a chute group passing below the discharge of the feed conveyor so as to receive a number of pouches being fed by the feed conveyor.

4,052,838

APPARATUS FOR PACKAGING NESTED, UNIFORMLY SHAPED ARTICLES

Barney W. Hilton, and William E. Bembenek, both of Dallas, Tex., assignors to Frito-Lay, Inc., Dallas, Tex.

Filed May 4, 1976, Ser. No. 682,905
Int. Cl.[2] B65B *35/34, 39/06, 5/06*
U.S. Cl. 53—159 17 Claims



1. Apparatus for inserting individual charges of nested, uniformly-shaped articles into containers comprising:

transfer and metering means for sequentially metering and separating individual charges of nested, uniformly-shaped articles from a supply thereof, including downwardly inclined conveyor means along which said individual charges move, said conveyor means having a lower discharge portion;

packaging means comprising a rotatably mounted hub member; and a plurality of sleeve members on said hub member, said sleeve members extending radially outwardly from said hub member and the outer end of said sleeve members being open and adapted to receive a said individual charge, said hub member being rotatably mounted adjacent said transfer and metering means for cooperation therewith to bring said outer end of respective ones of said sleeves adjacent said discharge of the conveyor means as said hub member rotates into the charge-receiving position in which said cooperating sleeve inclines downwardly from its outer end, said cooperating packaging means and said transfer and metering means being adapted for an individual charge to be transferred from said conveyor means discharge into the cooperating one of said sleeves, said sleeve members during rotation of said hub member moving intermittingly to said charge-receiving position and in sequence thereafter to an upper container-receiving position and in which the sleeve in container-receiving position is in the upper portion of the path of rotation of said sleeves, and is adapted for a container to be passed over said sleeve member, and to a discharge position in which the container with the charge contained therein is discharged from said sleeve member when the latter is positioned in the lower portion of said path of rotation;

rotating means for rotating said hub member to sequentially move each said sleeve member in a step-wise fashion to said charge-receiving position, upwardly to said container receiving position, and downwardly to said container discharge position, said transfer and metering means including means for metering a said individual charge into said cooperating sleeve in charge-receiving position; and

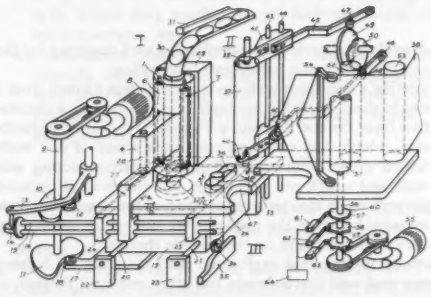
receiving means adjacent said discharge position of the sleeves for receiving containers with a charge of nested, uniformly-shaped articles therein.

4,052,839

COIN-PACKAGING MACHINE

Erwin Gross, Karlsruhe, Germany, assignor to Standardwerk Eugen Reis GmbH, Bruchsal, Germany

Filed July 27, 1976, Ser. No. 709,099
Claims priority, application Germany, Aug. 16, 1975, 2536427
Int. Cl.[2] B65B *11/04*
U.S. Cl. 53—212 14 Claims



1. Apparatus for packaging a stack of coins into a roll comprising a flat supporting plate, a hollow cylindrical tube member open at both ends movably mounted above said plate, one end of said tube being in slidable contact with said plate, said tube extending perpendicularly therefrom for receiving coins in said other end, said coins being supported in stacked condi-

tion on said plate, a first station having means for feeding a predetermined number of coins to said tube, a second station having means for feeding a wrapper and wrapping said coins, and a third station having means for discharging said wrapped coins, said stations being disposedly spaced from each other about the plate and means for conveying said tube and the coins therein in slidable contact with said plate sequentially from said first to second to third positions and thereafter said tube free of coins from said third to first position.

4,052,840

APPARATUS FOR SEVERING AND OVERLAPPING MATERIAL WEB SECTIONS, ESPECIALLY FOR A PACKAGING MACHINE FOR TOBACCO PRODUCTS

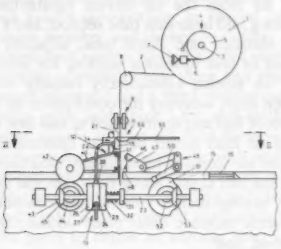
Ernst Schneeberger, Neuchatel, Switzerland, assignor to Molins Limited, London, England

Filed July 1, 1976, Ser. No. 701,949

Claims priority, application Switzerland, July 4, 1975, 8761/75

Int. Cl.[2] B65B *41/18*; B26D *7/06*

U.S. Cl. 53—389 **18 Claims**



1. Apparatus for severing sections of a material web and for overlapping the severed sections in pairs, especially for a packaging machine for the packaging of products which can be smoked, comprising a supply roll for supplying a material web, a withdrawal device for withdrawing the material web from the supply roll, a cutter device for cutting sections from the material web, a conveyor device for conveying the cut sections, a holder device comprising a suction nozzle arranged between the cutter device and the conveyor device adjacent the plane of travel of the material web, a control device comprising a pneumatic valve for operating the holder device by control of the application of suction through said nozzle such that said holder device fixedly holds a cut section for overlapping the same until the material web which continuously moves has displaced over the fixedly held cut section by an amount corresponding to a predetermined overlapping width, said pneumatic valve including means to vent said suction nozzle to atmosphere after fixedly holding said cut portion to precisely control said overlapping width.

4,052,841

MECHANISM FOR OPENING AND CLOSING A CROP MATERIAL ROLL FORMING REGION IN A ROLL FORMING MACHINE

Robert L. Rice, New Holland, and Aquila D. Mast, Lancaster, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Feb. 9, 1976, Ser. No. 656,753

Int. Cl.[2] A01D *39/00*

U.S. Cl. 56—341 **20 Claims**

1. In a crop material roll forming machine, the combination comprising:

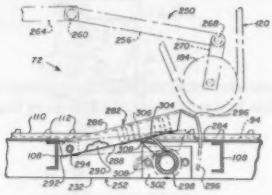
a mobile frame adapted to move across a field;

crop material delivery means supported by said frame;

upper flexible means movably mounted by said frame above said delivery means to define a roll forming region therebetween having inlet and discharge ends;

said delivery means including conveying means operable to move crop material in a predetermined direction along a path from adjacent said inlet end toward said discharge end of said region;

said upper flexible means being movable in a direction opposite to said predetermined direction for performing roll forming operation at said region;



ramp means positioned at said discharge end of said region and mounted to said frame for movement between a lowered position in which said ramp means is disposed adjacent said path and thereby facilitate the opening of said discharge end of said region and a raised position in which said ramp means extend generally into said path and thereby facilitate the closing of said discharge end of said region to the passage of crop material therethrough; and

means being movable relative to said frame for moving said ramp means between said positions.

4,052,842

CIRCUIT FOR ELECTRONIC WATCHES

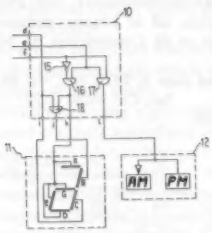
Jean-Luc Béguin, Neuchatel, and Willy Droz, Hauterive, both of Switzerland, assignors to Ebauches S.A., Neuchatel, Switzerland

Filed Dec. 29, 1975, Ser. No. 644,443

Claims priority, application Switzerland, Jan. 31, 1975, 1185/75

Int. Cl.[2] G04B *19/30*

U.S. Cl. 58—50 R **3 Claims**



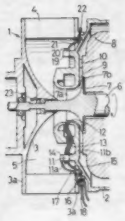
1. An electronic timepiece having a digital display, an AM-PM indicator, an hour units counter, and means to enable selection by way of a control input between a 24 hour clock display mode and a 12 hour clock display mode, the improvement wherein said selection means comprises a first and a second flip-flop circuit, a decoder circuit coupled between outputs of said flip-flop circuits and a digital display and AM-PM indicator for driving said display and indicator, and logic means coupled with the counter and said flip-flop circuits and responsive to the control input for interconnecting said flip-flop circuits to form a counter for the tens of hours when said 24 hour clock display mode is selected, and for connecting said first flip-flop circuit to count the tens of hours and said second flip-flop circuit to control the AM-PM indicator when said 12 hour clock display mode is selected.

4,052,843

APPARATUS FOR PREVENTING SURGING OF A GAS TURBINE

Masaaki Takizawa, Mishima, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyoda, Japan

Filed Sept. 23, 1975, Ser. No. 616,016
Claims priority, application Japan, June 4, 1975, 50-67978
Int. Cl.[2] F02C *9/08*
U.S. Cl. 60—39.28 R **6 Claims**



1. Apparatus for preventing surging of a gas turbine for an automobile, said gas turbine having an inlet air filter, a compressor and a bell-mouthed air intake positioned between said inlet air filter and said compressor, said apparatus comprising:

a differential pressure gauge which transmits an electric output signal responsive to the differential pressure ΔP between the air pressure immediately downstream of said air filter and the air pressure at the inlet of said compressor;

a function generator which receives each number N of rpm of the engine as an electric signal and transmits an output signal corresponding to the critical differential pressure ΔPs which causes surging at said number N of rpm of said gas turbine; and

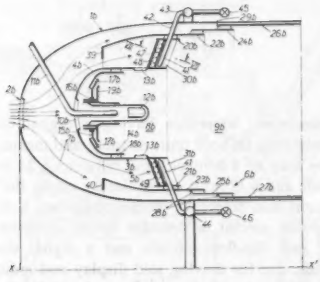
a comparator-function generator which receives ΔP and −ΔPs as input signals and transmits an output signal to control fuel control means when ΔP approaches ΔPs.

4,052,844

GAS TURBINE COMBUSTION CHAMBERS

Jacques Emile Jules Caruel, Dammarie-les-Lys; Hervé Alain Quillévéré, Issy-les-Moulineaux, and Philippe Marc Denis Gastebois, Melun, all of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France

Filed June 2, 1975, Ser. No. 583,189
Int. Cl.[2] F02C *7/22*
U.S. Cl. 60—39.65 **17 Claims**



1. A combustion chamber comprising:

a. a stepped flame tube placed in an air stream and comprising:

1. an upstream section bounding a first combustion zone extending parallel to the air stream,

2. a downstream section wider than the upstream section and bounding a second combustion zone extending parallel to the air stream, said downstream section having an upstream portion which extends over a major length thereof and has imperforate generally annular walls and passages therebetween for the entry of cooling air flowing film-like along said inperforate walls, and

3. shoulder means extending outwardly of the first combustion zone and generally transversely of the air stream direction, to form a step between said upstream and downstream tube sections, said step having a multiplicity of air intake apertures therethrough to admit into said second combustion zone a flow of air taken from said air stream and flowing substantially parallel thereto, and solid portions between said intake apertures to produce wakes in said flow of air,

b. fuel injection means in the first combustion zone for emitting jets of fuel towards the upstream end of said first combustion zone,

c. means for supplying the injection means with fuel at an idling flow rate,

d. air inlet means for feeding the first combustions zone with combustion air, said air inlet means comprising means for directing air from the air stream substantially parallel thereto along said upstream tube section, and a plurality of openings through said flame tube, adjacent the downstream end of said upstream section, for introducing air from the air stream substantially radially into the first combustion zone, whereby the combustion air is entrained by said jets of fuel and recirculated in said first combustion zone, said air inlet means being so dimensioned that the combustion air forms a substantially stoichiometric mixture with the fuel at said idling flow rate, the first combustion zone having such a volume that combustion of the stoichiometric mixture takes place within the first combustion zone, and

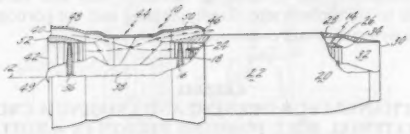
e. means for injecting a supplementary flow of fuel in said flame tube upstream of said second combustion zone to cause combustion of said supplementary flow of fuel in said wakes behind the said portions of said shoulder means, the volume of said second combustion zone being such that the combustion chamber has an overall volume sufficient to ensure re-ignition in flight.

4,052,845

VARIABLE RATIO BYPASS GAS TURBINE ENGINE WITH FLOW DIVERTER VALVE

Julius W. Tumavicus, Old Saybrook, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 481,439, June 20, 1974, Pat. No. 3,972,349.
This application Jan. 22, 1976, Ser. No. 651,671
Int. Cl.[2] F02K *3/06*
U.S. Cl. 60—226 R **12 Claims**



1. A variable bypass ratio turbojet engine including:

A. a front fan mounted for rotation about the engine axis,

B. an annularly shaped auxiliary inlet concentrically enveloping said front fan,

C. an engine fan concentrically enveloping said engine axis in spaced axial relation downstream of said front fan,

D. an annular thrust nozzle enveloping said engine fan and concentric therewith,

E. an annular inverter valve system concentric about the engine axis and positioned between said forward fan and auxiliary inlet and said engine fan and thrust nozzle so as

to be downstream of said front fan and auxiliary inlet and upstream of said engine fan and said thrust nozzle and communicating with each for inverting the flow relationship between the front fan and auxiliary inlet fluid streams comprising:

1. a fixed, annularly shaped upstream member shaped to define:
   a. a first duct system having a first annular inlet communicating with said auxiliary air inlet to receive all fluid flow therefrom and a first outlet comprising a plurality of radially extending and circumferentially spaced outlets communicating with said first inlet,
   b. a second duct system having a second annular inlet communicating with said front fan to receive all fluid therefrom and concentrically enveloping said first annular inlet to cooperate therewith in defining an annular inlet for said upstream member and a second outlet comprising a plurality of radially extending and circumferentially spaced outlets communicating with said second inlet and arranged alternately with said first outlets to define an annular outlet for said upstream member,
2. a fixed, annularly shaped downstream member positioned axially downstream in spaced relation to said upstream member and shaped to define:
   a. a third duct system having a third inlet comprising a plurality of radially extending and circumferentially spaced inlets and and a third annular outlet communicating with said third inlet and with said annular thrust nozzle so that all fluid flowing through said third annular outlet passes through said thrust nozzle,
   b. a fourth duct system having a fourth inlet comprising a plurality of radially extending and circumferentially spaced inlet ports arranged alternately with said third inlet ports to define an annular inlet for said downstream member and communicating with a fourth annular outlet concentrically enveloping said third annular outlet and cooperating therewith in defining an annular outlet for said downstream member and also communicating with said engine fan so that all fluid passing through said fourth annular outlet will flow through said engine fan,
3. a plurality of flapper valves actuatable to join the outlet of said first duct system to the inlets of said fourth duct system while the outlets of said second duct system are joined to the inlets of said third duct system when said flapper valves are in a first position so as to place said inverter valve system in parallel flow condition and said engine in high bypass ratio take-off condition, and actuatable to a second position wherein the outlets of said first duct system are joined to the inlets of said third duct system while the outlets of said second duct system are joined to the inlets of said fourth duct system so as to place said inverter valve system in series flow condition and said engine in low bypass ratio cruise condition.

4,052,846

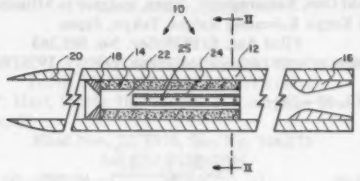
BAFFLED COMBUSTION CHAMBER

Klaus Schadow, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 8, 1976, Ser. No. 647,524
Int. Cl.² F02K *9/04*
U.S. Cl. 60—251 **3 Claims**

1. In a solid fuel ramjet engine having a combustion chamber defined between a forward injector plate, which contains an air inlet to enable the passage of ram air into the engine and to act further as a flame retarder, and an after nozzle and surrounded by a solid fuel grain, the improvement comprising:

baffle means fastened within said chamber between said injector plate and a point near the aft end of said grain; and said baffle extending from said point near the aft end of said fuel grain to a point spaced from said injector plate and



comprising interposing baffle surfaces between the inner surface of said grain and longitudinal axis of said chamber,

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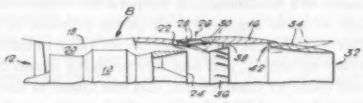
4,052,847

GAS TURBINE ENGINE GAS FLOW DUCTS

Leonard John Rodgers, Spondon, and Alan Stuart, Ashby-de-la-Zouch, both of England, assignors to Rolls-Royce Limited, London, England

Filed Feb. 2, 1976, Ser. No. 654,169
Claims priority, application United Kingdom, Feb. 14, 1975, 6321/75
Int. Cl.² F02K *3/06, 1/02*
U.S. Cl. 60—262 **10 Claims**



1. An exhaust flow duct for receiving fan air and exhaust gases from a ducted fan gas turbine engine power plant, said exhaust flow duct comprising:

an augmenter air intake positioned within the length of the exhaust flow duct and through which ambient air may flow into the exhaust flow duct;

a flow mixing device comprising a generally annular shaped member mounted coaxially within said exhaust flow duct in radially spaced apart relationship therewith, said generally annular shaped member having its upstream end positioned downstream of said augmenter air intake and having lobes formed at least in its downstream end portion with a converging exterior surface for causing flow exterior of said annular shaped member to converge in a downstream direction and a diverging interior surface for causing flow interior of said annular shaped member to diverge in a downstream direction and to mix with the converging exterior flow downstream of said annular shaped member; and

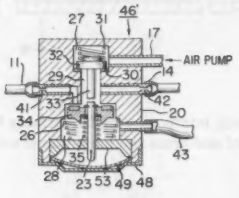
flap means for selectively opening and closing said augmenter air intake, said flap means being movable between a first position closing said augmenter air intake and permitting fan air and exhaust gases to respectively flow over the exterior and interior of said annularly shaped member and a second position wherein said augmenter air intake is opened to permit only ambieint air to flow over the exterior of said annular shaped member and to direct fan air and exhaust gases to flow through the interior of said annular shaped member.

4,052,848

ANTI-AFTERBURN SYSTEM

Hiroaki Ono, Katsuragosho, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 6, 1975, Ser. No. 602,263
Claims priority, application Japan, Feb. 27, 1975, 50-24572
Int. Cl.[2] F02B *75/10*
U.S. Cl. 60—290 **5 Claims**



1. An anti-afterburn system for an engine having an air pump, comprising a control valve for controlling secondary air supply from said pump to an exhaust system of the engine, a pressure differential responsive member dividing a housing into two chambers and being connected to said control valve, conduits connecting respectively said chambers with an intake manifold of the engine, a first orifice provided in one of said conduits so that said control valve is operated by abrupt variation of a pressure in said intake manifold to interrupt or reduce said secondary air supply, and a thermo valve means having a first chamber defined in a casing and supplied with an air pump pressure, a passage operatively connecting said first chamber with one of said two chambers, a first valve member opening and closing said passage, and a temperature sensing means responsive to a predetermined temperature to move said valve member so as to supply the air pump pressure to said one chamber, thereby operating said control valve to interrupt said secondary air supply, and said thermo valve means comprises a second chamber connected to said one chamber through said passage and to said first chamber which continuously communicates with the air pump pressure, said first valve member being located in said first chamber and normally closing the supply of said air pump pressure to said one chamber through said second chamber, a valve stem being slidably received in said casing adjacent to said sensing means, one end of said stem extending into said chamber and operatively connected to said first valve member to open the latter when the sensing means senses said predetermined temperature.

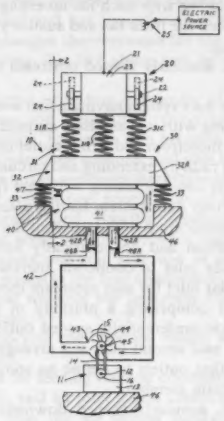
4,052,849

MECHANICAL WORK GENERATING MEANS

George D. Dumbaugh, Louisville, Ky., assignor to Vibranetics, Inc., Louisville, Ky.

Filed Oct. 20, 1975, Ser. No. 623,735
Int. Cl.[2] F03B *17/00*
U.S. Cl. 60—325 **9 Claims**

1. Mechanical work generating means, comprising:
a. first means for mechanically generating a heat component of work including excitor means provided with rotatable eccentrically-mounted weights;
b. second means, mechanically interconnected to said first means, for mechanically generating a non-heat component of work comprising yieldable means that are tuned to be substantially at their natural vibratory frequency and inertia absorbing means; and
c. third means, mechanically interconnected to said first and second means, for combining said heat and non-heat components of work into a resultant mechanical work output,



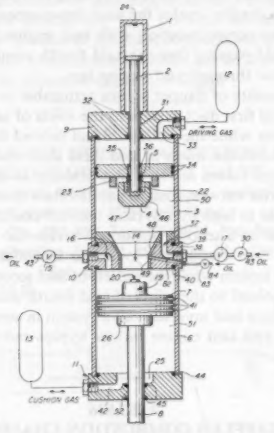
d. said third means comprising fluid-containing pump means and there being action caused upon the fluid contained therein by said heat and non-heat components of work.

4,052,850

THRUST GENERATOR

Udo H. Mohaupt, Cambridge, Canada, assignor to Institute of Gas Technology, Chicago, Ill.

Continuation-in-part of Ser. No. 621,687, Oct. 14, 1975, Pat. No. 3,999,384. This application Nov. 1, 1976, Ser. No. 737,717
Int. Cl.[2] F15B *1/02, 15/22*
U.S. Cl. 60—327 **11 Claims**



1. A thrust generator comprising:
a substantially gas-tight driving cylinder, a floating piston adapted for substantially gas-tight reciprocating movement within said driving cylinder, a driving gas accumulator means in communication with a first end of said driving cylinder, the second end of said driving cylinder having a driving port;
a substantially gas-tight cocking cylinder, a power piston adapted for substantially gas-tight reciprocating movement within said cocking cylinder, a cushion gas accumulator means in communication with a first end of said

cocking cylinder, the second end of said cocking cylinder having a driving port in communication with the driving port of said driving cylinder, said power piston having a poppet actuator means on the side of the piston toward said second end and a power piston rod on the other side of said piston adapted for substantially gas-tight reciprocating movement through a power piston rod hole in said first end delivering thrust from said thrust generator;

a poppet valve adapted for seating in substantially fluid-tight relation with a seating means in said driving port towards said driving cylinder, the other end of said poppet valve having a poppet valve rod adapted for substantially gas-tight reciprocating movement through a poppet rod hole in said floating piston and said first end of said driving cylinder, the other end of said driving port adapted for clearance passage of said poppet actuator;

a bleed port in communication with said driving port between said poppet actuator and said poppet valve when both said poppet actuator and said poppet valve are within said driving port and pressurized hydraulic fluid supply means and valve means to provide pressurized hydraulic fluid to aid in dislodgement of said poppet valve from said driving port;

a hydraulic fluid reservoir in communication with a hydraulic fluid pump and supply valve means in communication with said second end of said cocking cylinder and said pump whereby high pressure hydraulic fluid is delivered to the second end of said driving cylinder by said pump, passes through said driving port providing the force to move said power piston and drain from the second end of said cocking cylinder through said hydraulic fluid drain valve means to said reservoir; and

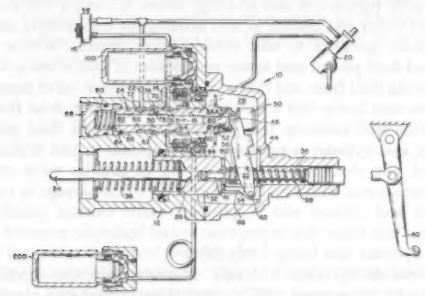
control means for operation of said hydraulic fluid supply valve and drain valve means.

4,052,851

HYDRAULIC BRAKE BOOSTER HAVING INDEPENDENT RESERVE SYSTEMS

Arthur K. Brown, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Oct. 4, 1976, Ser. No. 729,556
Int. Cl.² F15B *1/02, 20/00*
U.S. Cl. 60—404 **9 Claims**



1. A hydraulic brake booster comprising:

a housing defining a pressure chamber;

a spool valve slidably mounted within the housing;

said spool valve being movable to open and close communication to the pressure chamber;

a piston forming a portion of the pressure chamber and being responsive to the pressure within the pressure chamber to more relative to the housing for actuating braking;

a first accumulator connected to the housing and communicating with the pressure chamber when the pressure in the pressure chamber is below that required to move the piston; and

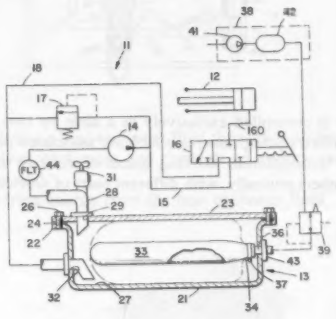
a second accumulator communicating with the pressure chamber when the pressure in the pressure chamber is below that required to move the piston.

4,052,852

CONSTANT PRESSURE SEALED FLUID STORAGE TANK FOR HYDRAULIC SYSTEMS

Cullen P. Hart, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 22, 1976, Ser. No. 744,073
Int. Cl.² F15B *1/06*
U.S. Cl. 60—478 **10 Claims**



1. An operating fluid storage fo a hydraulic system having variable operating fluid requirements comprising:

a rigid closed tank defining an interior chamber for storing said operating fluid and having first port means for receiving and releasing said fluid and having second port means for connection to a source of pressurized gas,

an expandable and contractable fluid-tight bladder disposed within said chamber of said tank and being communicated with said second port means to receive and release said gas as operating fluid is withdrawn and received at said tank, and

means for maintaining a predetermined substantially constant gas pressure within said bladder as the volume of operating fluid in said tank and the volume of said bladder undergoes changes.

4,052,853

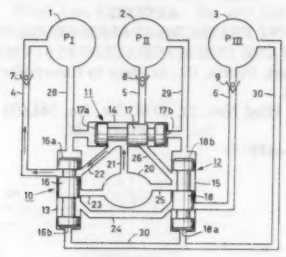
HOT-GAS RECIPROCATING MACHINE COMPRISING TWO OR MORE WORKING SPACES, PROVIDED WITH A CONTROL DEVICE FOR THE SUPPLY OF WORKING MEDIUM TO THE SAID WORKING SPACES

Jacobus Hubertus Abrahams, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 9, 1976, Ser. No. 721,671
Claims priority, application Netherlands, Sept. 19, 1975, 7511043
Int. Cl.² F02G *1/06*
U.S. Cl. 60—521 **2 Claims**

1. A hot-gas reciprocating machine comprising two or more working spaces, the volumes of which can be varied at a mutual phase difference by piston-like bodies which are coupled to a crank shaft; a working medium performing a thermodynamic cycle in each of the said working spaces during operation, each of the working spaces being connected, via an associated supply duct which includes a non-return valve which opens in the direction of the relevant working space, to a control device which, during each revolution of the crank shaft, successively connects each of the supply ducts separately to a source of pressurized working medium; said control device comprising at least one control member which is slidable in a housing in the direction of its longitudinal axis under the influence of medium pressures which act on the control member in a mutually opposed sense, said housing comprising at least one inlet

port which is connected to the source and at least one outlet port which is connected to the supply duct, characterized in that the control device is constructed so that each control



member is controlled exclusively as a slide by two mutually phase-shifted cycle pressures which are associated per control member with different working spaces or, relative to the control members mutually, with different pairs of working spaces.

4,052,854

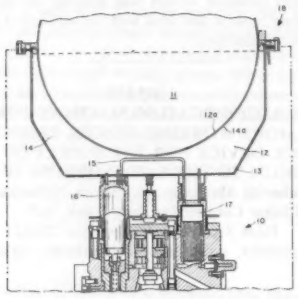
HEAT TRANSFER INTERFACE BETWEEN A HIGH TEMPERATURE HEAT SOURCE AND A HEAT SINK

Frits K. du Pré, and Hendrik A. Jaspers, both of Ossining, N.Y., assignors to North American Philips Corporation, New York, N.Y.

Filed July 22, 1974, Ser. No. 490,725

Int. Cl.² F02G *1/04*; F28D *13/00*; F28F *13/00*

U.S. Cl. 60—524 **7 Claims**



1. A Stirling engine comprising a heat source, working gas for the engine, a heater part in which working gas for the engine is heated, and a heat transfer interface, wherein

the interface comprises a pair of adjacent and closely spaced walls formed as generally adjacent flanged peripheries, metallic means for sealing said flanged peripheries together while defining a gap in the range of 0.002 to 0.009 inches between said hemispheric walls, a quantity of gas sealed within said gap, and means for releasably securing together said flanged peripheries to seal said gap while maintaining said spacing between said walls, and

the inner one of said concentric walls is a boundary wall of said heat source, and the other of said walls is a boundary wall of said heater part.

4,052,855

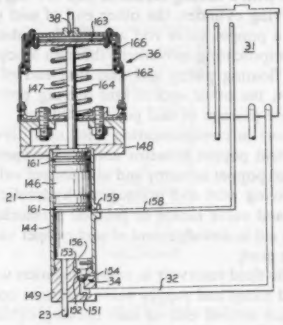
BRAKE MASTER CYLINDER CONSTRUCTION

Peter F. M. Prillinger, Peoria Heights; Paul C. Rosenberger, and Alfred W. Sieving, both of Decatur, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 450,974, March 14, 1974, Pat. No. 3,901,556. This application Apr. 23, 1975, Ser. No. 571,026

Int. Cl.² B60T *13/00*

U.S. Cl. 60—547 **1 Claim**

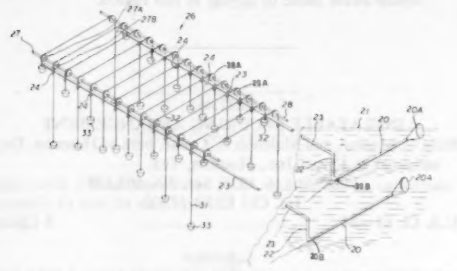


1. A master cylinder for applying hydraulic pressure to a vehicle brake with fluid derived from a make-up fluid tank comprising an upright cylindrical housing having an upper end closure and a lower end closure, a piston slidable vertically within said housing, means forming a breather port opening at the wall of said housing in position to communicate with the fluid volume therein only when said piston is substantially fully raised away from said lower end closure and forming an upwardly extending breather conduit from said opening to said make-up fluid tank which conduit is free of obstruction between said opening and said make-up fluid tank at all times, resilient means urging said piston upwardly towards said upper end closure, air pressure-operated means for urging said piston downward towards said lower end closure against the force of said resilient means in response to a braking signal to generate hydraulic pressure in said housing, means forming a first port at said lower end closure of said housing for transmitting said hydraulic pressure to said vehicle brake, means forming a second fluid port at said lower end closure of said housing for receiving fluid from said make-up tank, and check valve means within said lower end closure for blocking return fluid flow towards said make-up tank through said second fluid port when said cylinder is pressurized in response to said braking signal, said check valve means having an annular valve seat communicated with said second port by a first passage in said lower end closure and a spherical valve element seatable against said valve seat in response to said hydraulic pressure in said cylinder and being freely liftable from said valve seat in response to reversed hydraulic pressure, said check valve means having a rapid refill passage in said lower end closure extending upward from said valve seat and said valve element to communicate with the interior of said housing below said piston, at least the uppermost portion of said refill passage being of substantially larger diameter than said valve seat and said valve element to prevent said valve element from slowing the rate of flow of make-up fluid when said valve element lifts from said valve seat, said check valve means being situated below the level of said make-up fluid tank and below the level of said breather port whereby a static fluid pressure head from said make-up fluid tank acts against the underside of said spherical valve element to aid lifting of said valve element from said valve seat when said reversed hydraulic pressure occurs within said cylinder.

4,052,856
METHOD AND APPARATUS FOR HARNESSING THE POWER OF MOVING WATER

Robert Trotta, 2954 W. 8th St., Brooklyn, N.Y. 11224

Filed Oct. 30, 1975, Ser. No. 627,237
Int. Cl.[2] F03G 3/02, 3/04
U.S. Cl. 60—639 16 Claims



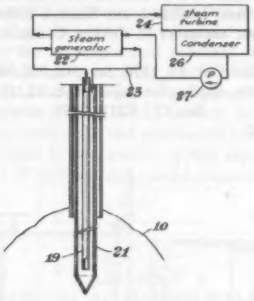
1. A system for the harnessing the power of moving liquid for producing useful work comprising:
   a pair of spaced apart drive shafts,
   a plurality of rotary means journalled on each of said drive shafts at spaced apart intervals to effect the drive thereof whereby the rotary means on one of said drive shafts has an opposite complementary rotary means on the other shaft,
   a unidirectional clutch means operatively connecting each such rotary means to its respective drive shaft whereby one drive shaft is rotated in one direction and the other drive shaft is driven in opposite direction as said rotary means is actuated,
   a flexible drive threaded over the respective complementary pairs of oppositely disposed rotary means,
   said flexible drive having opposed end portions,
   a container connected to each portion of the respective flexible drives,
   and means for alternately charging and discharging said containers disposed on opposite ends of said flexible drive with liquid in a predetermined sequence to effect the cascading of said containers in predetermined timed relationship over the respective drive shafts so that said cascading containers effect a continuous, uniform drive of the respective drive shafts.

4,052,857
GEOTHERMAL ENERGY FROM SALT FORMATIONS

Sidney J. Altschuler, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 6, 1976, Ser. No. 730,050
Int. Cl.[2] F03G 7/04
U.S. Cl. 60—641 6 Claims

1. A method of extracting geothermal energy comprising the steps of:
   a. drilling and casing a well into a rock salt formation to a depth at which the rock salt behaves plastically;
   b. inserting a closed end pipe into the well said pipe being filled with removable weighted material;
   c. sinking the pipe in the plastic salt to a depth at which the calculated energy output is of a selected value;
   d. inserting an insulated pipe within the sunken closed end pipe, said closed end pipe and said insulated pipe thus forming, in combination, a double pipe heat exchanger;

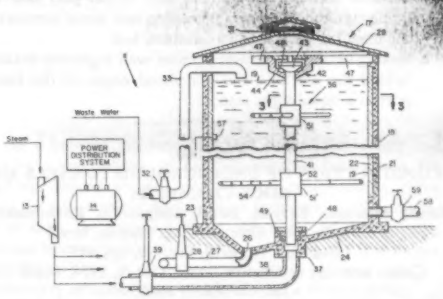


   e. circulating a heat exchange fluid through both the double pipe heat exchanger and through an energy extracting means; and
   f. recovering energy from the heat exchange fluid.

4,052,858
METHOD AND APPARATUS INTEGRATING WATER TREATMENT AND ELECTRICAL POWER PRODUCTION

Morris R. Jeppson, Box 4943, Carmel, Calif. 93921

Filed Jan. 8, 1975, Ser. No. 539,338
Int. Cl.[2] F01K 7/02
U.S. Cl. 60—648 44 Claims



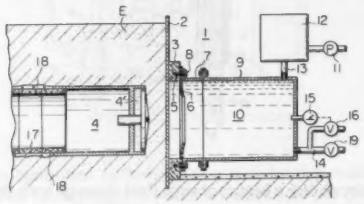
1. A process integrating power production and water treatment, comprising:
   bringing unsterilized water into proximity to an electrical power generating station of the form operated from a source of steam;
   converting a first portion of the energy content of said steam to electrical energy in said power generating station;
   utilizing another portion of said energy content of said steam to heat said unsterilized water to a temperature range at which living organisms therein are destroyed, said temperature range being below the boiling point of said unsterilized water;
   maintaining said water in liquid condition at said temperature range for a period of time sufficient to sterilize said water, said step of maintaining said water at said temperature range being accomplished at least in part by restricting the conduction of heat away from said water; and
   delivering said sterilized water to a water distribution system.

4,052,859

METHOD AND APPARATUS OF COMPLETING SLURRY SHIELD TUNNELING AT VERTICAL SHAFT

Yasuyuki Iwamitsu, Ichikawa, and Shigeru Kobayashi, Tokyo, both of Japan, assignors to Tekken Construction Co. Ltd., Japan

Filed Oct. 13, 1976, Ser. No. 732,045
Claims priority, application Japan, Feb. 12, 1976, 51-13155
Int. Cl.[2] E21D *9/04*
U.S. Cl. 61—42 13 Claims



1. A method of completing at a vertical shaft a tunneling through a highly water containing soft ground with a slurry shield type tunneling machine comprising steps of

a. providing a side wall having an initially closed final tunnel port of a diameter larger than that of said tunneling machine at a position along a vertical shaft wall where said tunneling machine is to reach,

b. defining a liquid-tight chamber inside the shaft and communicating with said tunnel port,

c. filling said liquid-tight chamber with a liquid under a pressure capable of resisting a pressure applied to said side wall by the soft ground,

d. opening the tunnel port with advances of the tunneling machine through the ground and tunnel port into the liquid-tight chamber while keeping said liquid pressure in the chamber substantially constant, and

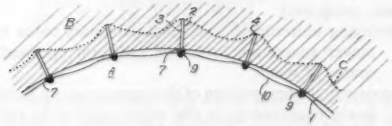
e. closing clearances between tunnel wall segments installed behind the machine and peripheral edges of the tunnel port in a liquid-tight manner.

4,052,860

CONSTRUCTION OF UNDERGROUND TUNNELS AND ROCK CHAMBERS

Israel Alterman, Savyon, Israel, assignor to Environmental Engineering Dr. Ing. Alterman Ltd., Savyon, Israel

Filed Nov. 13, 1975, Ser. No. 631,445
Claims priority, application Israel, Dec. 9, 1974, 46208
Int. Cl.[2] E21D *20/00*
U.S. Cl. 61—45 B 9 Claims



1. A method of converting the walls of a rock cavity into a load-bearing structure by prestressing comprising the steps of:

making a plurality of long bores in the walls along the entire cavity to be prestressed, said bores being angularly disposed in relation to the wall surface, and said bores being arranged in the shape of a one-sheet hyperboloid around and coaxial with said cavity,

inserting into each bore a tension member of high tensile strength and rigidly connecting a predetermined length thereof adjoining its inner end to the bore end portion, leaving a remaining part of said tension member unattached to the bore and causing the outer end of said tension member to protrude out of the bore into the cavity,

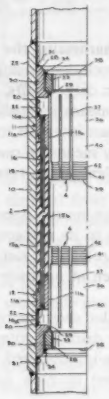
forcefully elongating the tension member by biasing the protruding end thereof against the rock surface, said elongation step being adapted to provide a resulting compression of the rock pattern adjacent the bore and the tension member therein at least commensurate with the largest tensile stress liable to appear in this region.

4,052,861

INFLATABLE SECURING ARRANGEMENT

Billy C. Malone, and Malcolm G. Coone, both of Houston, Tex., assignors to Lynes, Inc., Houston, Tex.

Filed Aug. 4, 1975, Ser. No. 603,138
Int. Cl.[2] E02B *17/00*
U.S. Cl. 61—86 5 Claims



1. An inflatable securing arrangement comprising:

a. support means;

b. an annular elastomer body carried by said support means;

c. gripping means carried by said support means and extending longitudinally within said annular elastomer body whereby said elastomer body and gripping means may be moved inwardly relative to said support means; and

d. reinforcing means extending longitudinally of said elastomer body, said reinforcing means having a pair of reinforcing sheaths each having first ends secured to said support means and second ends terminaing in spaced relation to each other.

4,052,862

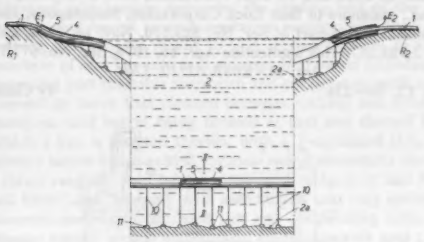
METHOD OF SUBMERGING PIPELINES

Jacques Edouard Lamy, Fontenay-aux-Roses, France, assignor to Compagnie Generale pour les Developpements Operationnels des Richesses Sous-Marines "C.G. Doris", Paris, France

Filed May 28, 1976, Ser. No. 690,873
Claims priority, application France, May 30, 1975, 75.16962
Int. Cl.[2] F16L *1/00*
U.S. Cl. 61—112 12 Claims

1. In a method of laying a pipeline in a body of water having a bed, the improvement comprising the steps of (a) enclosing the pipeline over the whole of its length within a ballast tube such that an intermediate space is created between the pipeline and the ballast tube, (b) filling said intermediate space with a liquid less dense than water, to give the assembly of said pipe-

line and ballast tube a positive buoyancy while said assembly is being laid, and (c) replacing said liquid in said intermediate



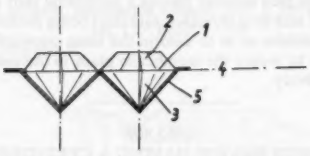
space with a medium denser than said liquid, to cause said assembly to rest on said bed.

4,052,863

MULTIPLE GEM SETTING HAVING A COMPONENT OF GEMS SET IN FUSION ADHESIVE FOIL

Martin Poll, Fritzens, Austria, assignor to D. Swarovski & Co., Wattens-Triol, Austria

Filed Nov. 4, 1975, Ser. No. 628,665
Claims priority, application Germany, Nov. 4, 1974, 2452250
Int. Cl.² A44C *17/02*
U.S. Cl. 63—28 **18 Claims**



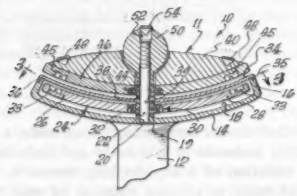
1. A component comprising a plurality of gemstones containing visible faces and seating faces, said gemstones being mounted by their seating faces in a given arrangement and with a given mutual spacing therebetween in respective recesses in a support, said support being a continuous foil of fusion adhesive.

4,052,864

MOBILE JEWELRY MOUNTING MOVED BY UNBALANCED MAGNETIC MEMBER

Werner K. Hofsaess, 2903 Palmer Drive, Los Angeles, Calif. 90065

Filed Sept. 23, 1976, Ser. No. 725,863
Int. Cl.² A44C *17/02*
U.S. Cl. 63—31 **10 Claims**



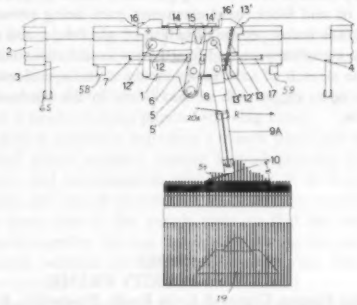
1. A mobile jewelry mounting mechanism comprising:
a mounting base member;
an unbalanced rotatable member supported on said base member in freely rotatable relation thereto;
a first magnetic means arranged within said unbalanced rotatable member to rotate therewith;
a jewelry-setting support means rotatably mounted on said base member and superposed over said unbalanced rotatable member;
a second magnetic means arranged within said jewelry-setting support means wherein said first and second magnetic means provide corresponding repelling forces to each other; and means for securing said unbalanced rotatable member and said jewelry-setting support means in relatively rotatable relation to one another, and in a relation whereby movements of said unbalanced rotatable member are transmitted to said jewelry-setting support means by interaction of said first and second magnetic means.

4,052,865

THREAD-GUIDING MECHANISM FOR FLAT-BED KNITTING MACHINE

Gino Zamarco, Via Cavour 11, Somma Lombardo (Varese), Italy (21019)

Filed Apr. 29, 1976, Ser. No. 681,590
Claims priority, application Italy, Apr. 29, 1975, 22832/75
Int. Cl.² D04B *15/52*
U.S. Cl. 66—128 **10 Claims**

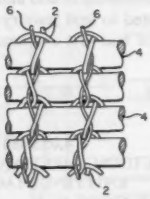


1. In a knitting machine provided with a flat needle bed carrying a multiplicity of knitting needles, feed means for supplying thread to said needles, and reciprocating drive means for successively displacing an active group of said needles to draw the supplied thread into a row of loops during each machine cycle, the improvement wherein said feed means comprises:
a plurality of slides each provided with a thread guide;
support means enabling the displacement of said slides adjacent one another across said needle bed with entrainment of respective threads past said needles, each thread guide being movable on its slide between two positions relatively offset in the direction of slide displacement;
a pair of end stops for each slide;
transport means coupled with said drive means for entraining each slide during a machine cycle along a path limited by said end stops to extend over only a fraction of said row of loops, with presentation of the corresponding thread to less than all the needles of said group, the distances traveled by said slides complementing one another with limited overlap whereby said row of loops is formed from a succession of different threads; and
switchover means on each slide controlled by the associated end stops for moving the thread guide thereof from one of said positions, advanced in the direction of slide displacement, to the other of said positions at the end of its path, with resulting removal of the corresponding thread from the reach of needles engaging the thread of another slide starting on a continuation of said path.

4,052,866
HIGH-RECOVERY FORCE WARP KNIT STRETCH FABRIC WITH LENGTHWISE STABILIZATION

Linda Anne Saunders, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 27, 1976, Ser. No. 727,364
Int. Cl.[2] D04B 23/08, 23/10
U.S. Cl. 66—193 5 Claims

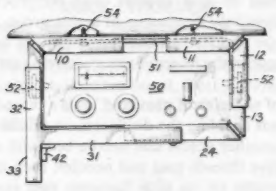


1. A high recovery force warp knit fabric suitable for dispensing application, comprising chain stitches of inelastic yarn, elastomer yarn laid into each course of said chain stitches to provide said fabric with widthwise stretch of at least 200% and recovery force of at least 750 g per cm of fabric length at 100% stretch of said fabric, said elastomer yarn being present in at least 20,000 denier per cm of length of said fabric, and substantially inextensible yarn laid lengthwise in said chain stitches to limit the stretch of said fabric in the direction of said chain stitches upon the stretch of said fabric in the elastomer yarn direction.

4,052,867
LOCKING SECURITY FRAME

John Ray Faunce, Gruver & Ervin Roads, Pipersville, Pa. 18947

Filed Aug. 2, 1976, Ser. No. 710,713
Int. Cl.[2] E05B 73/00
U.S. Cl. 70—58 5 Claims

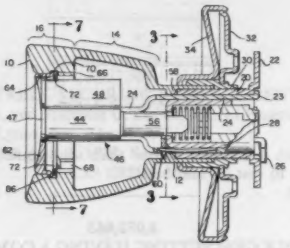


1. A locking security frame comprising four frame sides defining an open center which will receive a four sided article to be secured against theft, each side frame including two parts which are adjustable lengthwise of each other to fit the size of the article, said parts being of channeled cross section with the opening facing inwardly of the frame, the two channel parts at one side frame being disposed to enclose and prevent access to the means used to attach the article to a fixed body, the two channel parts at each of the other three side frames having a sliding fit within each other so that they telescope relative to each other, and releasible securing means for retaining the two parts of each of said three side frames in a fixed lengthwise position, said channelled parts of said other three side frames serving to enclose said releasible securing means and thereby preventing access to said securing means to prevent their release.

4,052,868
DOOR KNOB CONSTRUCTION

Walter E. Best, and R. Gene McCullum, both of Indianapolis, Ind., assignors to Best Lock Corporation, Indianapolis, Ind.

Continuation-in-part of Ser. No. 523,570, Nov. 14, 1974, Pat. No. 3,955,387. This application Apr. 16, 1976, Ser. No. 677,727
Int. Cl.[2] E05B 63/10, 3/04
U.S. Cl. 70—224 19 Claims

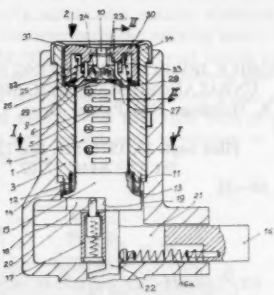


1. A knob construction, comprising
a knob body having an outer end opening of circular cross section,
the wall of said opening being formed with an axially-outward-facing stop shoulder and a radially-inward-opening groove forward of such shoulder,
and an end face member having a peripheral skirt extending toward said stop shoulder, said skirt being pressed toward said shoulder so as to deform the same outward into said groove to secure the member in place in the end opening of the body.

4,052,869
ANTI-THEFT DEVICE HAVING A CYLINDER LOCK

Günter Weber, Wuppertal, Germany, assignor to Neiman S. A., Courbevoie, France

Filed Aug. 5, 1975, Ser. No. 602,035
Claims priority, application Germany, Aug. 29, 1974, 2441463
Int. Cl.[2] E05B 65/12
U.S. Cl. 70—252 8 Claims



1. An anti-theft device comprising a lock body, a cylindrical barrel rotatably mounted in said body and including an axial passage for insertion of a key, locking means in said barrel engaging said body to prevent rotation of said barrel, said locking means being operable by insertion of a correctly coded key to free the barrel for rotation within the body, said barrel being axially slidable within said body between an outer, locked position and inner, operative position, closure means disposed at an entrance end of said axial passage and movable between a first position in which said means is effective to prevent insertion of a key into said passage in said outer position of said barrel and second position to allow insertion of the

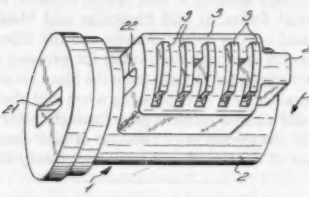
key into said passage in the inner, operative position of said barrel, and means biasing said closure means towards said first position, pressure applied to said closure means against the action of said biasing means by the leading end of the key, moving said barrel to said operative position and thereafter moving said closure means to said second position to allow insertion of said key into said passage, said barrel including an operating part rotatable therewith and cooperating with a bolt element to move that element between locking and releasing positions, said barrel being formed at that end thereof from which a key is inserted therein, with a T-sectioned slot, said closure means being guided for axial radial movement therein, a thrust ring disposed between opposed surfaces of said body and barrel and rotatable with said barrel, said ring including elements projecting into said slot and cooperating with said closure means, means biasing said barrel towards said outer position, and wherein a cap is rotatably mounted at that end of the barrel from which said key is inserted and between the thrust ring and a ring protecting said body, said cap being coupled to rotate with the barrel by lugs positively engaged in the T-shaped groove, said lugs being radially and axially contiguous with free ends of said parts of the thrust ring.

4,052,870

BARREL HAVING TUMBLER PLATES FOR A CYLINDRICAL LOCK

Guy Degeye, Meru, and Roger Filaine, Chaumont-en-Vexin, both of France, assignors to Paul Journee S.A., Courbevoie, France

Filed Sept. 18, 1975, Ser. No. 614,452
Claims priority, application France, Oct. 3, 1974, 74-33301
Int. Cl.[2] E05B *27/00*
U.S. Cl. 70—364 R **1 Claim**



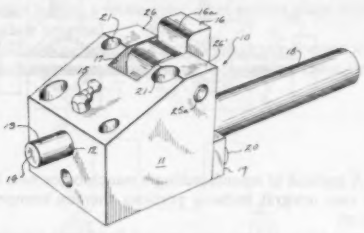
1. A barrel having tumbler plates for a cylindrical lock, said barrel comprising a cylindrical body having a center cavity communicating laterally of the axis of the body with two diametrically opposed cylindrical surfaces of the body to form openings in said surfaces, and a core of plastic material insertable at one end of said center cavity and passing thereinto to occupy said cavity, and having a plurality of radial slots said slots registering with said openings, a plurality of tumbler plates each tumbler plate being received within a corresponding one of said slots and a plurality of return springs each one of which is associated with a corresponding one of said plates, each of said springs extending between an opposed shoulder of its associated tumbler plate and a shoulder within the slot within which the plate is located to bias the plate outwardly of the slot, a substantially rigid second shoulder on the plate facing in the direction in which the plate is biased by said spring, an elastically deflectable boss formed on a surface of said slot and defining a shoulder confronting said rigid shoulder of said plate whereby said plate is insertable into said slot only from that end towards which the plate is biased by the spring and only upon deflection of said boss and after insertion into slot is prevented from being removed by interengagement of said second shoulder of the plate and said shoulder of the boss, said center cavity of the body comprising at least one ramp extending from said one end of said cavity and which terminates in a shoulder and said core comprising a complementary profile which terminates in a projection which clips onto the shoulder of said ramp at the end of the introduction of said core into said body to prevent the removal of said core from said one end, a stop means within the cavity against which the core abuts when inserted to limit the extent to which said core can be inserted into said cavity from said one end.

4,052,871

STOCK-PIERCING PUNCH MECHANISM

James E. Persik, and Gerald E. Persik, both of Menomonee Falls, Wis., assignors to J. J. & M., Milwaukee, Wis.

Filed Aug. 13, 1976, Ser. No. 714,186
Int. Cl.[2] B21D *28/14*
U.S. Cl. 72—44 **1 Claim**



1. A stock-piercing punch mechanism for converting the vertical stroke of a press ram into a nonvertical stock-piercing stroke, which punch mechanism includes:

a. a base member provided with a cam trigger-receiving slot and a stock-piercing punch-receiving bore;

b. a punch assembly including a punch plate and an elongated punch member having a stock-piercing tip at its outer end positioned in said bore for reciprocal movement; said punch member being removably connected at its inner end to the punch plate so that the elongated punch member having the stock-piercing tip can be replaced without completely disassemblying the punch mechanism;

c. a cam trigger pivotably mounted in the cam triggerreceiving slot in said member, said trigger having a first convex surface which is adapted to receive a stock-piercing force from a press ram to cause the trigger to pivot and a second convex surface which as the trigger pivots in response to the stock-piercing force transmits that force to the punch plate so as to move the punch member partially out of the bore to a stock-piercing position, said cam trigger being further provided with a radially extending stop member which contacts the punch member and limits the extent of the movement of the trigger when the stock-piercing force is relieved so that when the punch member returns to its original position in the bore the trigger is properly aligned to receive a stock-piercing force;

d. compression spring means which restore the punch and the cam trigger to their original position upon relief of the stock-piercing force; and

e. lubrication means which include a lubricant reservoir consisting of an annular groove in the base member which is located intermediate the length of said bore and surrounds the outside of the punch member, said lubrication means further including a first passage leading from the outside of the base member to the groove so that lubricant can be introduced through said passage into said groove and a second passage leading from the groove so that lubricant can leave the groove, said groove being adapted to receive and hold lubricant so that the movement of the punch member within the bore will pick up and distribute lubricant from said groove along the outer surface of the punch member and the interior surface of the bore so as to reduce frictional wear.

4,052,872
STANCHIONS

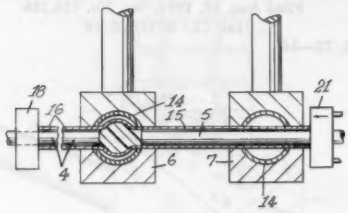
Peter Erwin Herr, Sandton, Transvaal, South Africa, assignor to Springbok Appointments (Proprietary) Limited, Johannesburg, Transvaal, South Africa

Filed Dec. 1, 1975, Ser. No. 636,796

Claims priority, application South Africa, Dec. 3, 1974, 74/7674

Int. Cl.² B21D *22/10*

U.S. Cl. 72—62 **6 Claims**



1. A method of manufacturing a stanchion or tube having at least two integral bulbous portions thereon comprising the steps of:

a. providing at least two spaced fixed split cavities on the outside of a stanchion tube, the inner surfaces of the cavities being shaped to define the outer contours of the integral bulbous portions of the completed stanchion;

b. applying a compressive force to a predetermined quantity of flowable and substantially incompressible material within the tube between the inner ends of two rods extending into the tube from the ends thereof, and one of which rods passes completely through the region of one of the cavities, this first compression being effected in the region of the other of the cavities to cause the tube to deform into substantial conformity with the inner surface of the said other cavity;

c. releasing the compressive force between the rod ends;

d. withdrawing the rod passing completely through the said one cavity such that its end is at least in the region of the end of the said one cavity most remote from the already formed bulbous portion;

e. moving the other rod into the region of the said one cavity;

f. applying a compressive force to a predetermined quantity of flowable and substantially incompressible material in the latter region to cause the walls of the tube to deform into substantial conformity with the said one cavity, and

g. releasing the compressive force on the rods and moving them apart at least sufficiently to enable the tube to be removed therefrom after the split cavities are moved apart to an open position.

4,052,873
APPARATUS FOR CONTINUOUS PRESSING OF BOLTS, SCREW BLANKS OR SIMILAR PARTS

Horst Murzin, and Gunter Grygo, both of Karl-Marx-Stadt, Germany, assignors to Veb Schraubenkombinat, Karl-Marx-Stadt, Germany

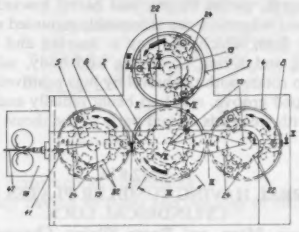
Filed July 6, 1976, Ser. No. 702,862

Claims priority, application Germany, July 3, 1975, 187060

Int. Cl.² B21J *9/18*

U.S. Cl. 72—185 **7 Claims**

1. Apparatus for shearing blanks from elongated rod-shaped workpieces and for pressing such blanks into bolts or similar configurations in a continuous operation, comprising a plurality of rotary elements arranged closely adjacent each other rotatable about parallel axes, each of said rotary elements being provided in the region of its periphery with blank receiving means, said rotary elements cooperating in pairs with each other and including a central rotary element, the blank receiving means of which are receiving blanks after the latter are sheared off and maintain said blanks during the pressing thereof until the finel discharge of the formed blanks, and a plurality of additional rotary elements arranged about the circumference of said central rotary element, one of said additional elements serving to shear blanks from the elongated rod-shaped workpieces and to transfer such blanks to the blank receiving means of the central rotary element, and at least two additional rotary elements for partly forming said blanks; drive means for rotating said rotary elements about their axes in such a manner that the rotary elements of cooperating pairs are respectively driven in opposite directions and so that the blank receiving means on one rotary element of each pair will become successively aligned with corresponding blank receiving means on the other rotary element of the respective pair;



means coordinated with said blank receiving means of said one additional rotary elements for shearing blanks from elongated rod-shaped workpieces; and means coordinated with said blank receiving means of all rotary elements for applying axial forces to such blanks for transferring such blanks from said one additional rotary element to said central element, for applying opposite axial forces to said blanks as said blank receiving means on said central rotary element and the other additional rotary elements approach each other for pressing said blanks, and for discharging said blanks from the blank receiving means of said central element after pressing when said blank receiving means of said central element pass through a discharge zone displaced in the direction of rotation of said central element downstream of the last of said additional rotary elements.

4,052,874
METHOD OF PRODUCING TUBULAR BODY IN A PRESS ROLL PIERCING MILL

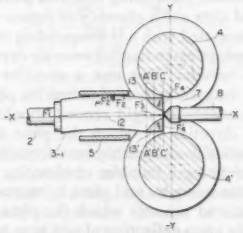
Seishiro Yoshiwara; Minoru Kawaharada, and Samon Yanagimoto, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed July 19, 1976, Ser. No. 706,563

Claims priority, application Japan, July 18, 1975, 50-88031

Int. Cl.² B21B *17/04*

U.S. Cl. 72—209 **1 Claim**



1. In a method for producing a cylindrical metallic tubular body by rolling a polygonal billet in a press roll piercing mill, the improvement comprising:

first causing only the rolls of the press roll piercing mill to roll the front end of the billet prior to contact the center

portion of the front end of the billet with the tip of the piercing plug for preventing bending of the billet by the pressing force and maintaining the axis of the billet on the pass center line; and

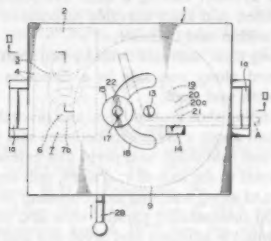
bringing the front end of the billet into contact with the piercing plug of the press roll piercing mill to begin the piercing operation on the pass center line only after the billet has moved into the pass a distance at least 0.15 times the outside diameter of the rolled tubular body from the point of the start of rolling of the front end of the billet by the rolls of the press roll piercing mill, whereby non-uniformity of the wall thickness of the hollow shell is reduced to no more than 25%.

4,052,875

SMALL SIZE, PORTABLE BENDER

Kaneaki Sakamoto, Chigasaki, Japan, assignor to Kabushiki Kaisha Ogura Chuck Seisakusho, Japan

Filed Aug. 6, 1976, Ser. No. 712,144
Claims priority, application Japan, Aug. 30, 1975, 50-105325; Nov. 21, 1975, 50-139997
Int. Cl.² B21D *7/024*
U.S. Cl. 72—217 **4 Claims**



1. A portable bender having a case body which is small in both size and weight enough to permit transportion of said bender by the hands of a user, and therein comprising a miniature, single-phase commutator motor, a drive shaft, a reduction gear mechanism for transmitting a rotational drive force from said motor to said drive shaft, clutch means for connecting and disconnecting the transmission of said rotational drive force to said drive shaft, a stationary shaft disposed coaxially of said drive shaft to protrude through said case body, stopper block means for a member to be bent disposed on the outer surface of said case body to be spaced at a determined distance from said stationary shaft, a slot formed in said outer surface arcuately elongated around the center of said stationary shaft, a bending roller provided on said outer surface and so linked to said drive shaft as to be turned along said arcuately elongated slot for applying a bending force to a member to be bent, bending angle control means operable to cause said clutch means to disconnect said rotational drive force from said drive shaft when said drive shaft has turned to a determined angle, and elastic means for restoring said drive shaft to the initial position when said clutch has disconnected said rotational drive force from said drive shaft.

4,052,876

BEDPLATES FOR A ROLLING MILL OR THE LIKE

Friedrich Rotter, Kreuztal Kredenbach, Germany, assignor to Schloemann-Siemag Aktiengesellschaft, Germany

Filed Dec. 5, 1975, Ser. No. 638,130
Claims priority, application Germany, Dec. 20, 1974, 2460313
Int. Cl.² B21B *31/00*
U.S. Cl. 72—237 **1 Claim**

1. A rolling mill or the like comprising:

a pair of vertically arranged spaced apart housings one behind the other, each having a window extending through the housings from its front side to its back side for receiving rolls of the mill,

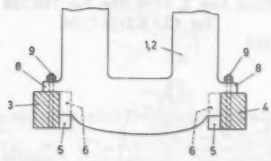
horizontal extending feet formed on the opposite outer sides of the lower portion of each said housing, and having straight supportable horizontal surfaces,

a vertical projection extending perpendicularly downwardly from each said feet and each having three vertical engageable surfaces,

a pair of elongated bedplates, one bedplate engaging said supportable horizontal surfaces of said housings on similar opposite side thereof, and the other bedplate engaging said supportable horizontal sufaces of said housings on said other similar opposite side thereof,

said bedplates being formed of an as cast or as a hot rolled product having a rectangular cross section shape throughout their lengths,

a vertical groove for each vertical projection formed in each of said bedplates, said groove each having three straight



vertical engageable surfaces, two of which are constructed and arranged to engage two corresponding surfaces of an associated said vertical projection,

each said grooves being made so that one of its straight engageable surfaces provide a space between a said remaining surface of said straight engageable surface of a said vertical projection of said housings,

filler means, of wedge like configuration for each groove, each filler means having opposed straight engageable surfaces, each said filler means locatable in a groove between one of said straight vertical surfaces thereof and said remaining straight engaging surface of a vertical projection of a housing for stabilizing said housings,

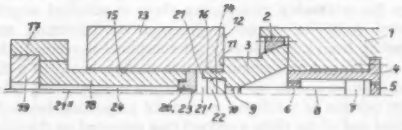
each bedplate having a surface for supporting said supportable horizontal surfaces of an associated horizontal foot of said housings and thereby carrying the weight of said housings, and means for securing each of said feet to said associated bedplate.

4,052,877

EXTRUSION PRESS FOR INDIRECT EXTRUSION

Franz Josef Zilges, Monchengladbach, and Klaus Siegert, Berlin, both of Germany, assignors to Schldemann-Siemag Aktiengesellschaft, Germany

Filed Feb. 24, 1976, Ser. No. 660,936
Claims priority, application Germany, Mar. 5, 1975, 2509490
Int. Cl.² B21C *23/02, 35/04, 35/06*
U.S. Cl. 72—253 A **5 Claims**



1. An extrusion press for indirect extrusion comprising

a counter platen

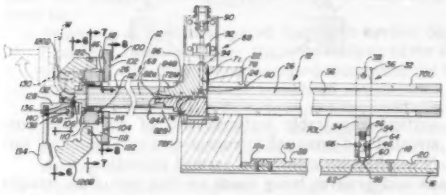
a cylinder cross-head

tie-rods connecting the counter platen and cylinder cross-head

a moving cross-head

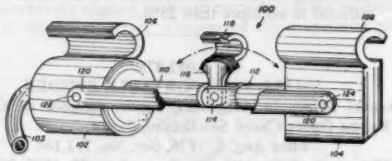
a ram mounted on the cylinder cross-head for moving the moving cross-head.
a hollow stem mounted on the counter platen and extending towards the moving cross-head
an extrusion die at the end of the hollow stem
a billet container between the moving cross-head and the counter platen, which has a billet-receiving bore and which can be moved by the moving cross-head over the die and hollow stem to perform an extrusion operation
a sealing plate for sealing one end of the said bore
a hollow cylindrical portion provided on the sealing plate for projecting into said bore, and defining a cylindrical recess with an aperture at the bottom thereof
a dummy block to be received in said cylindrical recess, and
a piston arranged in said aperture, and actuable to push the dummy block out of the recess.

4,052,878
TUBE BENDING APPARATUS
Dennis E. Connelly, 3305 S. Clermont, Denver, Colo. 80222
Filed Aug. 2, 1976, Ser. No. 710,728
Int. Cl.[2] B21D *7/04*
U.S. Cl. 72—293 **13 Claims**



1. Apparatus for bending tubular goods comprising: a bedplate having an upwardly facing surface; an upstanding support member attached atop said bedplate, said support member having a horizontally-disposed bore therethrough; a tubular slide mounted within the bore for longitudinal slidable movement in overhanging relation above the upwardly facing surface of the bedplate, said slide having a pair of diametrically-opposed parallel slots extending in the direction of the length thereof; releasable stop means carried by the slide and coacting with the bedplate to temporarily hold said slide in selected longitudinal positions; clamping means associated with the support member including opposed jaws disposed within the slots in the slide for relative movement toward and away from one another, said jaws preventing rotational movement of the slide relative to the support member while permitting relative longitudinal movement therebetween, and said jaws being operative upon actuation to clamp upon a tubular workpiece and hold same in coaxial relation within the slide for conjoint longitudinal movement; means for actuating the jaws of the clamping means; means carried by the slide in longitudinally spaced relation to the jaws of the clamping means coacting therewith to maintain the workpiece in coaxial relation; a radial flange fastened to one end of the slide; a first ring mounted for rotational movement in face-to-face coaxial relation to said flange; means interconnecting said first ring and flange for releasably maintaining them in selected angularly adjusted positions; arcuately-grooved anvil-forming means depending from said first ring for rotational movement therewith and hinged movement relative thereto between a disengaged position and an operative position in supporting relation to that portion of a tubular workpiece projecting beyond the adjacent end of the slide; a second ring mounted on the side for relative rotational movement thereto and to said first ring; means defining a bending tool mounted on said second ring for rotational movement therewith and for independent hinged movement relative thereto and to the anvil when rotated into a position in opposed relation to the groove in the latter, said tool cooperating with said anvil upon actuation to bend a workpiece located therebetween through at least a portion of the arc defined by the groove in the latter.

4,052,879
CABLE BENDER
Silas R. Crees, Eau Gallie, Fla. 32935
Division of Ser. No. 581,035, May 27, 1975, Pat. No. 3,988,918, which is a division of Ser. No. 434,365, Jan. 17, 1974, Pat. No. 3,888,101. This application Aug. 31, 1976, Ser. No. 719,314
Int. Cl.[2] B21D *7/024*
U.S. Cl. 72—318 **3 Claims**



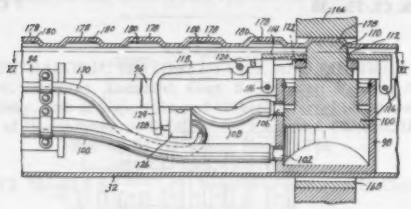
1. A power bender for electrical cable and the like, comprising:
a hydraulic cylinder having a shaft extending axially into said cylinder, said shaft movable responsive to hydraulic pressure within said cylinder;
a first bending shoe with said cylinder and shaft combination and opened along one side in a direction substantially parallel with said shaft;
a second bending shoe spaced from, and pivotal with respect to said shaft about a pivot axis between said second bending shoe and said shaft, said pivot axis extending substantially normal to the axis of said shaft, said second bending shoe opened along a second side opposing said first side in a direction substantially parallel with said shaft;
a bending knuckle adjacent said pivot axis and between said first and second bending shoes;
a tie arm pivotably coupled at one end to said hydraulic cylinder and pivotably coupled at the other end to said second bending shoe at a point on said second bending shoe spaced from said pivot axis; and wherein
cable to be bent is inserted in said first and second bending shoes by placing said cable across said bending knuckle at a slight angle with respect to the axis of said shaft and thereafter rotating either said cable or said bender slightly so as to align said cable within said first and second bending shoe in a direction substantially parallel with the axis on said shaft, and wherein said cable may subsequently be bent by applying internal hydraulic pressure within said cylinder, causing said shaft to extend from said cylinder and cooperate with said tie arm to drive said second bending shoe in a predetermined curved path about said pivot axis.

4,052,880
PIPE PERFORATING MACHINE
Robert L. Cullinan; Ronald W. Jay; Keith Beck, and Lloyd J. Miller, all of Paxton, Nebr., assignors to Noah E. Foulks, Dodge City, Kans.
Filed Aug. 10, 1976, Ser. No. 713,240
Int. Cl.[2] B21D *28/10, 28/28*
U.S. Cl. 72—326 **12 Claims**

1. A pipe perforating machine comprising:
a. a frame operable to support a pipe in a stationary position,
b. cooperating die members carried by said frame and including a male die supported by said frame for movement in a straight line radial to said pipe, said male die having a pair of generally parallel, closely spaced apart cutting edges of a length at least several times the lateral spacing therebetween, the central portions of said cutting edges extending generally at right angles to the radial movement

of said die, and the end portions thereof being inclined obtusely away from a plane established by the central portions of said cutting edges, and away from the confronting wall surface of said pipe, to a radial distance from said plane greater than the wall thickness of said pipe, and

c. power means operable to move said male die radially of said pipe to engage a wall of said pipe and to form a perforation in said wall, the radial movement of said die,



after it initially engages said pipe wall, being greater than the wall thickness of said pipe, but less than the radial spacing between the central portions and the extreme ends of said die cutting edges, whereby the central portion of the strip of pipe wall between said die cutting edges is offset laterally from the pipe wall by a distance greater than the wall thickness, and the ends of said pipe wall strip are left connected to the standing portion of the pipe wall.

4,052,881

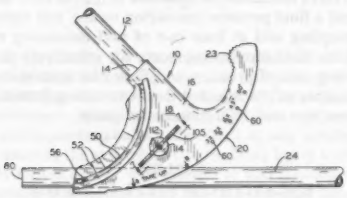
PROCESS FOR PROVIDING OFFSET BENDS OF THE CORRECT DIMENSION IN PIPE AND THE LIKE

Ralph W. Mount, R.D. 1, Zelienople, Pa.

Continuation of Ser. No. 322,026, Jan. 8, 1973, abandoned. This application Aug. 4, 1975, Ser. No. 601,358

Int. Cl.[2] B21D *7/14*; B21C *51/00*

U.S. Cl. 72—459 **2 Claims**



1. The process for effecting offset bends in pipe and the like with a bending tool having an arcuate concaved anvil surface with pairs of predetermined stop location openings disposed angularly about said anvil, comprising the steps of inserting a cross member through a selected pair of aligned openings in the walls of the concaved anvil surface to form a stop and at an anvil location corresponding to the ratio of the offset to the distance between the respective bends, disposing the bending tool at a predetermined distance from the end of the pipe at the location where the first bend is to be effected, and with the bending tool and anvil in position, wrapping the pipe around the anvil until contacting said stop to perform a first bend, relocating the anvil to a second location on the pipe where reverse bending is to be performed determined by the value of said ratio and wrapping the pipe around the anvil until the pipe comes in contact with said stop to effect a combination of offset bending which is determinative of the ratio of the offset of the respective bends and the distance between said bends, and following the bending operation, reaming the end of the pipe or conduit with a reamer integral with the bending tool.

4,052,882

TESTING AND CALIBRATING INSTRUMENT

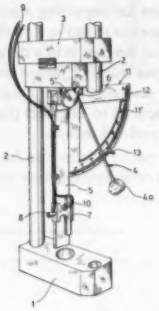
Ulrich Wittkowski, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Dec. 15, 1975, Ser. No. 640,852

Claims priority, application Germany, Dec. 14, 1974, 2459194

Int. Cl.[2] G01P *21/00*

U.S. Cl. 73—1 D **9 Claims**



1. A testing and calibrating instrument comprising, in combination:

a. support means;

b. a pendular hammer mounted on and suspended from said support means for pivotal movement in a given plane;

c. an elongated pendular anvil mounted on said support means for pivotal movement in at least approximately the same plane, the length of said anvil extending generally downwardly from the point where it is suspended from said support means, said anvil being rigid throughout its length and said hammer and anvil being dimensioned and positioned with respect to each other such that said hammer strikes said anvil at a given impact point which lies at least approximately at the level of a nodal point of bending oscillations which arise in said anvil when the same is struck by said hammer; and

d. means for attaching a test acceleration sensor as well as a standard acceleration sensor to said anvil at the level of said impact point.

4,052,883

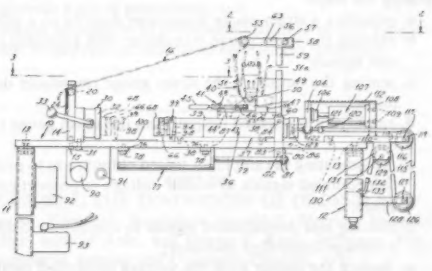
STATIC FREE MAGNETIC HOLDING AND RELEASE MEANS

Angelo Turnas, St. Clair Shores, Mich., assignor to Ring Tool and Die Company, Detroit, Mich.

Filed Oct. 12, 1976, Ser. No. 731,228

Int. Cl.[2] G01N *3/30*

U.S. Cl. 73—12 **8 Claims**



1. In a static free magnetic holding and release means, the combination of:

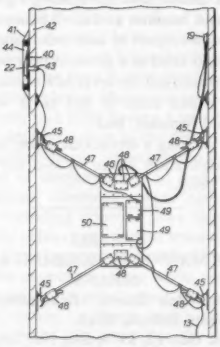
a. a permanent magnet means operable between an energized condition and a de-energized condition;
b. a preloaded holding means movable to a first position in engagement with said permanent magnet means for a holding engagement with the permanent magnetic means when it is in an energized condition, and movable to a second position by the preload thereon when the permanent magnet means is in a de-energized condition for releasing the holding means;
c. preload means for imparting a preload in one direction on the holding means to move it to said second position when the permanent magnet is in a de-energized condition, and,
d. said preloaded holding means including a steel plate engageably by said permanent magnet means, and an aluminum plate secured to the steel plate for operative connection to said preload means.

4,052,884

METHOD AND APPARATUS FOR DETERMINING STRAIN DATA DURING PILING

Lionel John Milberger, Bryan, and Richard Allen Zimmer, College Station, both of Tex., assignors to The British Petroleum Company Limited, London, England

Filed Feb. 25, 1976, Ser. No. 661,374
Int. Cl.² G01L *5/00*
U.S. Cl. 73—12 **11 Claims**



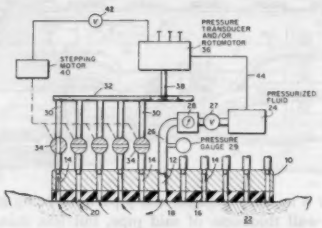
1. A method of determining strain data during piling comprising the steps:
a. mounting a strain gauge transducer directly to a pile;
b. exciting the strain gauge transducer with alternating current signals;
c. sensing the output of the strain gauge transducer during piling;
d. amplifying the sensed output from the strain gauge transducer;
e. demodulating the amplified sensed output so as to produce demodulated signals in which voltage is proportional to strain;
f. utilising said demodulated signals to control the output of a voltage controlled oscillator;
g. feeding the output from the voltage controlled oscillator to a telemetry transmitter, and
h. feeding the output from the telemetry transmitter to an antenna mounted directly to said pile.

4,052,885

PORTABLE DEVICE AND METHOD FOR DETERMINING PERMEABILITY CHARACTERISTICS OF EARTH FORMATIONS

Lowell Z. Shuck, Morgantown, W. Va., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Aug. 24, 1976, Ser. No. 717,429
Int. Cl.² G01N *15/08*
U.S. Cl. 73—38 **7 Claims**



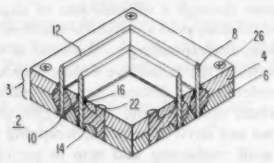
1. A device for determining maximum permeability direction and magnitude of permeability of an earth formation, comprising a housing having a planar surface, a fluid-injecting passageway in said housing in open registry with said surface, a plurality of fluid-monitoring ports in said housing in open registry with said surface, with said fluid-monitoring ports being spaced apart from one another and said fluid-injecting passageway in a predetermined array, seal means carried by said housing in an abutting relationship with said surface for providing a substantially fluid-tight seal with said earth formation when said housing is positioned in a contiguous relationship with a surface of said earth formation, said seal means having a plurality of apertures therethrough in respective registry with said fluid-injecting passageway and each of said plurality of fluid-monitoring ports, a fluid reservoir means coupled to said fluid-injecting passageway for injecting a fluid into said earth formation, at least one of a fluid flow measuring means and a fluid pressure measuring means, and means selectively coupling said at least one of said measuring means to each of the fluid-monitoring ports for selectively measuring said at least one of pressure and flow characteristics in a selected manner of the injected fluid emanating from said earth formations into said fluid-monitoring ports.

4,052,886

ENCAVITATED STEEL RULE DIE

James A. Buick, Telford, Pa., assignor to Best Line Warehouse, Inc., Telford, Pa.

Filed June 18, 1976, Ser. No. 697,312
Int. Cl.² B31B *1/20*
U.S. Cl. 93—58.3 **24 Claims**



1. A die used for cutting and scoring paperboard and plastic material comprising:
a. a unitary, substantially solid base member having at least one slot cut in a surface thereof;
b. a steel rule having a base edge and an operative edge;
c. a cavity formed in said base member to communicate with

said slot, said slot and said cavity defining a passage through which said rule is inserted so that said operative edge of said rule extends up through the top surface of said base member;

d. semi-rigid filling material filling said cavity, said semi-rigid material filling said cavity adapted to anchor said steel rule to said base member by engaging the opposed surfaces of said rule and said cavity substantially throughout the surface areas of said opposed surfaces.

4,052,887

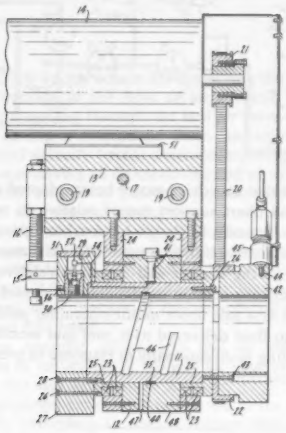
ULTRASONIC TESTING DEVICE AND METHOD

Lee A. Sheridan, Lombard; Gary S. Kovener; Bernard Ostrofsky, both of Naperville, and Hilbert J. Nebelsiek, Aurora, all of Ill., assignors to Standard Oil Company, Chicago, Ill.

Filed Apr. 5, 1976, Ser. No. 673,706

Int. Cl.² G01N *29/00*

U.S. Cl. 73—67.8 S **20 Claims**



1. An apparatus for the ultrasonic non-destructive testing of elongated bodies or coatings thereon comprising a rotating member holding one or more cylindrical focus transducers, said transducers capable of sending ultrasonic pulses and receiving corresponding echo pulses back as said rotating member is rotated on the axis relative to the body being tested while said body moves axially with respect to said rotating member, said apparatus containing water resistant bearings, functionally disposed for supporting the rotating member.

4,052,888

APPARATUS FOR THE ULTRASONIC EXAMINATION OF BODIES HAVING NON-PLANAR SURFACES

Thomas Graham Brown, Aberdour; Damir Josip Miroslav Skrgatic, Livingston; Graeme William Younger, Newbridge, and John Cook Fortune, Edinburgh, all of Scotland, assignors to Sonicaid Limited, Bognor Regis, England

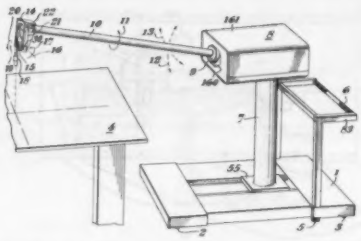
Filed July 8, 1976, Ser. No. 703,635

Claims priority, application United Kingdom, July 12, 1975, 29390/75

Int. Cl.² G01N *29/04*

U.S. Cl. 73—67.8 S **27 Claims**

1. Apparatus for the ultrasonic examination of bodies having non-planar surfaces, including a longitudinally extending probe which directs a beam of ultrasonic pulses into the body and receives reflected pulses from the body, wherein the probe is mounted on a boom so that it is pivotable about first and second mutually perpendicular axes fixed in the boom, said boom being mounted on a column so that it is pivotable about a third axis perpendicular to the axis of the boom and a fourth axis perpendicular to said third axis, said third and fourth axes being fixed in the column, wherein means are provided to produce electrical signals defining the instantaneous position of



a point on the longitudinal axis of the probe and the instantaneous attitude of said axis with reference to a coordinate system.

4,052,889

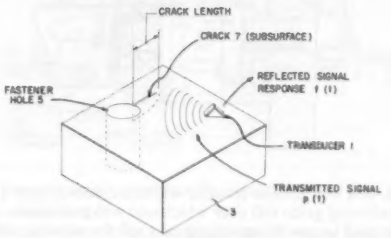
SYSTEM FOR MEASUREMENT OF SUBSURFACE FATIGUE CRACK SIZE

Anthony N. Mucciardi, Silver Spring, Md., and Ramesh Shankar, Reston, Va., assignors to Adaptronics, Inc., McLean, Va.

Filed June 10, 1976, Ser. No. 694,546

Int. Cl.² G01N *29/00*

U.S. Cl. 73—67.8 S **24 Claims**



1. A system for measurement of surface and subsurface material flaw size which comprises,

a. means for obtaining data as a function of a flaw in a medium,

b. means to perform spectral analysis on said data,

c. means to perform a cepstral analysis on said data,

d. means responsive to the output of both (b) and (c) to provide a set of parameters; and

e. means responsive to predetermined ones of said parameters to provide an estimated flaw length indication

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4,052,890

MEASURING THE TENDERNESS OF COOKED BEEF

Henry W. Kammlah, Scottsdale; Harold K. Herring, Paradise Valley, both of Ariz., and Duane E. Koch, Jefferson, Wis., assignors to Armour and Company, Phoenix, Ariz.

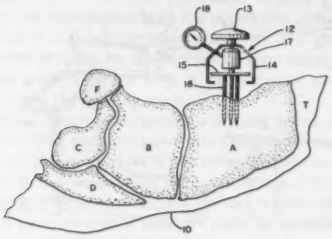
Filed Feb. 18, 1976, Ser. No. 658,888

Int. Cl.² G01N *3/42*

U.S. Cl. 73—81 **3 Claims**

1. In a process for determining the tenderness of cooked

rounds of beef, the steps of pressing a pointed probe into the proximal end portion of the Semimembranosus muscle of



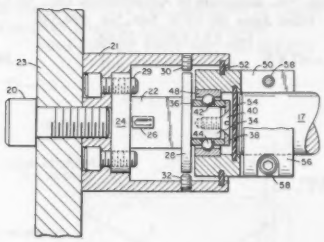
cooked beef to a pedetermined depth, and measuring the maximum force of penetration.

4,052,891

WEB TENSION MONITOR

Edward C. Bartlett, Skyline Terrace Rte. No. 1 Box 133B, Claremont, N.H. 03743

Filed Oct. 14, 1976, Ser. No. 732,535
Int. Cl.[2] G01L *5/10*
U.S. Cl. 73—144 **6 Claims**



1. In a web tension monitor which includes at least a tension monitoring guide roll over which said web is movable, a frame, and shaft means for mounting said roll for rotation relative to said frame, a system for continuously monitoring the tension in said web comprising at least one housing having a base attached to said frame and having an open end formed therein, a strain member cantilever-mounted within said housing and extending in a direction away from said frame, at least one strain gauge mounted on said strain member, an electrical circuit connected to said strain gauge to indicate its output, a first ring extending from said strain member, a second ring at the end of said shaft means, said second ring surrounding said first ring, each of said rings having two diametrically opposed confronting openings formed therein, a bearing ball being disposed in each pair of confronting openings, whereby said two rings are coupled together, deflection of said web in response to web tension causing said shaft means to apply cantilever loading force to said strain member, the electrical characteristics and output of said strain gauge thereby being varied.

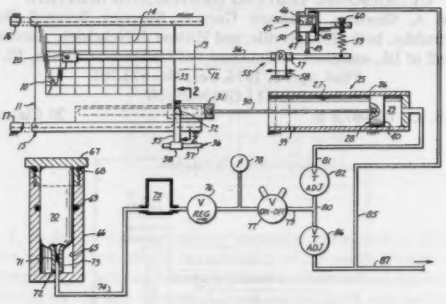
4,052,892

PRESSURE AND VOLUME RECORDING APPARATUS

Lawrence T. Browne, Santa Barbara, Calif., assignor to Browne Engineering Corporation, Santa Barbara, Calif.

Filed Nov. 15, 1976, Ser. No. 741,810
Int. Cl.[2] G01F *17/00*
U.S. Cl. 73—149 **9 Claims**

1. Apparatus for supplying a flow of fluid under pressure to a delivery conduit, and measuring the total volume of fluid passed by the delivery conduit and also the resistance to the discharge of said flow from the delivery conduit, said apparatus comprising: pressure-regulated fluid supply means; chart recorder means comprising a first axis drive motor, and a second axis drive motor, said motors being actuable by fluid under pressure; a first axis conduit and a second axis conduit connecting the respective first and second drive motors to said fluid supply means; a first axis restrictor and a second axis restrictor in the respective first and second axis conduits between the respective motor and the fluid supply means, chart support means for supporting a chart for movement along said



first axis, said first axis drive motor being adapted to move the chart and said chart support means relative to one another, marker support means for holding a marker against the chart, said second axis drive motor connected to said marker support means to move the marker and the chart relative to one another, said delivery conduit interconnected to said second axis conduit, said first axis drive motor operating unidirectionally in response to fluid delivered to it, and said second axis drive motor operating bi-directionally in response to pressure in said second axis conduit.

4,052,893

MEASURING RESERVOIR OIL SATURATION

Robert P. Murphy, and Wiliam W. Owens, both of Tulsa, Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Sept. 29, 1976, Ser. No. 727,929
Int. Cl.[2] E21B *47/10*
U.S. Cl. 73—155 **6 Claims**

1. A method of logging a subsurface formation to determine both residual and mobile oil saturations comprising:

drilling a well through the subsurface formation using an oil-base drilling fluid;

producing fluids from the subsurface formation to remove drilling fluid filtrate from the formation;

logging the formation with, in any order, a short range electrical resistivity logging device and a pulsed neutron capture log;

injecting into the formation sufficient salt water to displace mobile formation fluids at least two feet from the bore hole, the salinity of said salt water being greater than 100,000 ppm NaCl;

logging the formation with, in any order, a short range electrical resistivity logging device and a pulsed neutron capture logging device;

injecting into the formation sufficient fresh water to displace mobile formation fluids at least two feet from the bore hole, said fresh water having a salinity of less than 5,000 ppm NaCl; and,

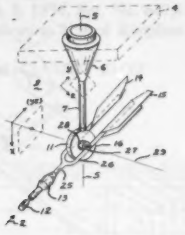
logging the formation with a pulsed neutron capture logging device.

4,052,894

VELOCITY VECTOR SENSOR FOR LOW SPEED AIRFLOWS

William R. Pinnell, Dayton, and James E. Leger, Enon, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 2, 1976, Ser. No. 737,946
Int. Cl.[2] G01W 1/02
U.S. Cl. 73—189 1 Claim



1. A velocity vector sensor for measuring the velocity and vectorial direction of the flow of an air mass relative to a payload body moving through the said air mass, the said payload body having a determined three-dimensional reference space, the said velocity vector sensor comprising:

a. an air vane having an upstream end and an axis of rotation;

b. an anemometer head positioned at the upstream end of the said air vane and having:

1. a first thermistor bead exposed to the said air mass flow;

2. a second thermistor bead shielded from said air flow;

c. means including an electrical bridge circuit cooperating with the said first and the said second thermistor beads for providing an indication of the velocity of said air flow over said first bead;

d. rotating assembly attached to said air vane providing freedom of movement of the said air vane in a plane containing the said vane axis of rotation;

e. a first photopotentiometer positioned in the said rotating assembly providing an output voltage responsive to the directional position of the said vane in the said plane that contains the vane and the said axis of rotation of the vane;

f. a base assembly attached to the said payload body;

g. a shaft rotatably positioned on said base assembly and attached to said rotating assembly; and

h. a second photopotentiometer positioned in said base assembly cooperating with the said rotatable shaft providing an output voltage responsive to the position of the plane containing the said vane in the said reference space.

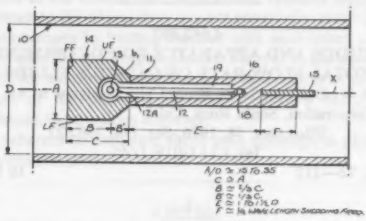
4,052,895

OBSTACLE ASSEMBLY FOR VORTEX-TYPE FLOWMETER

Peter J. Herzl, Morrisville, and Warren Strohmeier, Warminster, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.

Filed Jan. 12, 1977, Ser. No. 758,849
Int. Cl.[2] G01F 1/32
U.S. Cl. 73—194 VS 6 Claims

1. A vortex-type flowmeter in which a fluid to be metered is conducted through a flow tube of relatively small diameter having a obstacle assembly therein to cause vortex shedding at a frequency which is a function of flow rate, said assembly including a block fixedly mounted across the tube at right angles to the direction of flow, the block having a flat front face which is presented to the incoming fluid and a flat rear face parallel thereto which is spaced from the front face by a distance equal to the height of the front face, the block having upper and lower side surfaces with bevelled rear corners connecting the side surfaces to the flat rear face, the bevelled rear corners occupying a rear zone which lies in a zone about one-third the distance between the rear of the front faces of the block, the resultant block configuration acting to enhance the shedding characteristics of the assembly and to produce substantially linear flow rate measurements at low Reynolds numbers.

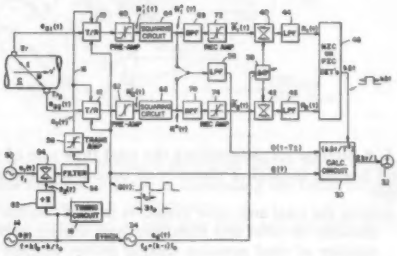


4,052,896

ULTRASONIC FLOW METER

Bock W. Lee, El Cerrito, Calif.; William H. Vander Heyden, and Stephen S. Bell, both of Tulsa, Okla., assignors to Badger Meter, Inc., Richmond, Calif.

Filed Nov. 26, 1975, Ser. No. 635,737
Int. Cl.[2] G01F 1/66
U.S. Cl. 73—194 A 23 Claims



1. A flow detecting apparatus for measuring fluid flow in a conduit comprising:

a. a pair of compressional energy transmitting and receiving transducer means adapted to be disposed adjacent said conduit for transmitting compressional energy signals along a path having a component axially of said conduit and a component transversely of said conduit, and for receiving said compressional energy signals transmitted along said path,

b. means for generating a first signal having a frequency, f, less than a predetermined upper limit, for providing unambiguous phase detection between signals received by said transducer means,

c. means for generating a second signal having a frequency f_1,

d. means for mixing said first and second signals to produce sideband frequencies $f_1 + f$ and $f_1 - f$, said frequency f_1 selected so that said sideband frequencies $f_1 + f$ and $f_1 - f$ are transmitted over a selected part of the spectrum,

e. means for applying at least one of said sideband frequencies to said transducer means, for transmitting signal bursts in opposite directions along said path, and

f. means for processing said received signals for providing a signal corresponding to (1) the transit time, t, of one of said signals along said path, (2) the square of the transit tiem t^2, and (3) the difference in transit time Δt between said received signals, said processing means further providing a quotient signal proportional to Δt divided by t^2, said quotient signal being substantially proportional to the

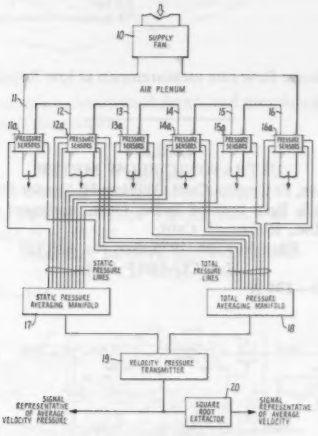
velocity, v, of fluid flow such that Δt divided by t^2 is proportional to v divided by l, where l is the length of said path.

4,052,897

METHODS AND APPARATUS FOR DETERMINING TOTAL FLOW RATE OF GASEOUS FLUIDS

Kenneth W. DeBaun, Santa Rosa, Calif., assignor to Air Monitor Corporation, Santa Rosa, Calif.

Filed Oct. 28, 1976, Ser. No. 736,327
Int. Cl.[2] G01F 1/46
U.S. Cl. 73—212 **10 Claims**



1. A method for determining the total flow rate of gaseous fluid passing through a plurality of conduits comprising the steps:

sensing the total and static pressures in each conduit using a plurality of total and static pressure sensing probes, the number of total pressure sensing probes utilized in each conduit being selected and deployed to cover cross-sectional areas of substantially equal size,

connecting the total pressure sensing probes of all conduits to one pressure averaging manifold,

connecting the static pressure sensing probes of all conduits to a second pressure averaging manifold,

then comprising the pressure difference between the average total pressure of the one manifold with the average static pressure of the second manifold to determine the pressure difference.

4,052,898

CRANK DRIVE SYSTEM FOR COLD PILGER MILLS DRIVE OR THE LIKE

Charles Leroy Miller, New Wilmington, Pa., and Harry Calhoon Ledebur, Canfield, Ohio, assignors to Wean United, Inc., Pittsburgh, Pa.

Filed Sept. 13, 1976, Ser. No. 722,906
Int. Cl.[2] B21B 17/00, 35/00
U.S. Cl. 72—214 **10 Claims**

10. In combination with a reciprocating mass such as a cold pilger rolling mill having a pass line,

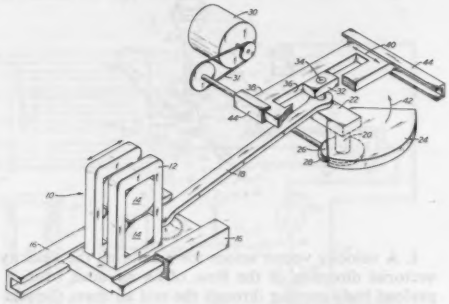
a drive means for said mill,

a crank means connected to said drive means,

means for connecting said crank means to said mill to effect said reciprocation thereof,

a first counterweight means arranged in a plane parallel to the direction of movement of said reciprocating mill,

means for connecting said first counterweight means to said crank means in a manner to impart an oscillatory movement to said counterweight means, said oscillatory movement being in a perpendicular direction relative to said direction of movement of said mill, and which oscillatory movement has a cycle substantially equal to that of the reciprocating movement of said mill and which is out of phase with said reciprocating movement of said mill, whereby the acceleration and deceleration torques of said counterweight means compensate, respectively, the acceleration and deceleration torques of said reciprocating movement of said mill, and



a second counterweight means connected to said crank means in a manner to balance at least a portion of the inertia of the throw of said crank means, said mill, and said means for connecting said crank means to said mill,

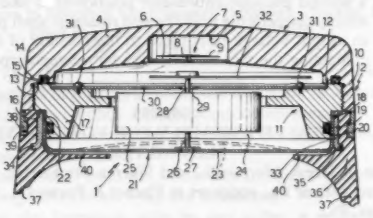
said two counterweight means and said means for connecting said first counterweight means to said crank means being arranged in a plane substantially coincident to said pass line with due allowance for passage of the product.

4,052,899

DEPTHOMETER FOR UNDERWATER IMMERSION

Francesco Longhetto, Turin, Italy, assignor to Semperit Anstalt, Schaan, Liechtenstein

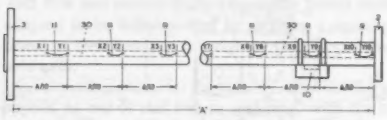
Filed Mar. 31, 1976, Ser. No. 672,238
Claims priority, application Italy, Apr. 4, 1975, 67865/75
Int. Cl.[2] G01F 23/14; G01L 7/08
U.S. Cl. 73—300 **15 Claims**



1. Depthometer for underwater immersion of the type comprising an outer waterproof casing, at least a portion of which consists of transparent material; a graduated dial visible from the outside through the transparent portion of the casing; an element deformable in accordance with the external pressure; and a mechanical transducer, the inlet of which is connected to the deformable element, and the outlet of which is connected to an indicator element to move the latter along the dial in accordance with the deformation of the deformable element; the depthometer being characterized in that said deformable element consists of an elastic end wall of a metal cup member including a peripheral lateral wall extending from the periphery of the end wall and integral with it, supporting means rigid with the lateral wall and supporting the mechanical trans-

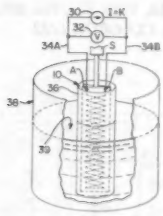
ducer, the cup member forming part of and sealed to the outer casing; and stiffening means cooperating with said lateral wall to make this latter indeformable with the end wall.

4,052,900
TRANSDUCERS
William Ganderton, Yarm, England, assignor to Tioxide Group Limited, Billingham, England
Filed Jan. 9, 1976, Ser. No. 647,817
Claims priority, application United Kingdom, Jan. 11, 1975, 01234/75
Int. Cl.² G01F *23/12*
U.S. Cl. 73—313 **23 Claims**



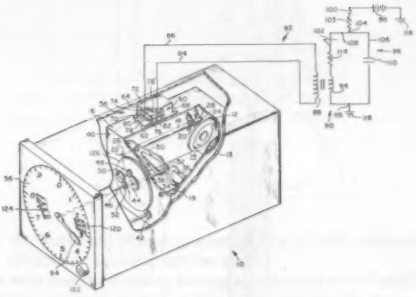
1. A transducer comprising a support member having a hollow opening therein for receiving a movable core, said support member having mounted thereon a primary coil connectable to a source of alternating electric current, a secondary coil mounted around the primary coil, a plurality of electrically conductive links axially spaced along the length of the secondary coil each link connecting spaced turns of the secondary coil and the ends of the secondary coil being connectable to output means responsive to the electric current induced in said secondary coil to generate an output voltage having predetermined characteristics, whereby the number and position of said electrically conductive links in said secondary coil determine said characteristics of said output voltage.

4,052,901
LEVEL DETECTING
Albion P. Bjork, Tower Road, Lincoln, Mass. 01773
Filed July 29, 1976, Ser. No. 709,796
Int. Cl.² G01L *1/20*; H01C *3/06, 3/10*
U.S. Cl. 73—313 **9 Claims**



1. Pressure detection apparatus comprising,
a transducer element for immersion in a pressure medium, or a fluent environment or subjection to a like activating force, comprising means defining an extended length of springy lengthwise folded sheet material for extending into the pressure medium with its folded portions contacting each other face to face at portions exposed to a pressure above a predetermined threshold on the backs of said folded portions or other activating force,
the springy character of the folded sheet material and geometric loading arrangement holding the folded portions apart in other portions thereof,
means defining elongated conductors on opposing front faces of the folded portions comprising a periodic zig-zag waveform conductive path on each facing portion of the folded sheet arranged in complementary form so that the two conductive paths for X intersections to short out the conductive paths by butting contact wherever the facing portions are pressed together, so that the remaining portions of the conductive paths define resistive lengths in a circuit to the extent they are not essentially shorted out of said circuits by butting contact with each other,
and means for applying an electric current to the conductors and for measuring a parameter of said circuit as an indication of the pressure or other activating force which presses the portions together,
and wherein an insulator sheet with openings is placed between the folded portions.

4,052,902
STATIC FRICTION FREE ALTIMETER
Paul W. Moseman, Jr., and Russell F. Hart, both of Davenport, Iowa, assignors to The Bendix Corporation, South Bend, Ind.
Filed Dec. 29, 1976, Ser. No. 755,277
Int. Cl.² G01L *7/12*
U.S. Cl. 73—387 **7 Claims**



1. In an altimeter having a gear train driven by an altitiude responsive member, means for attenuating the frictional resistance of said gear train comprising:
a housing connected to said gear train, said housing having a chamber located herein;
a piezoelectrical transducer located in said chamber; and
energy control means for supplying said piezoelectrical transducer with cyclic electrical signals, said cyclic electrical signals causing the physical dimensions of said piezoelectrical transducer to change and transmit vibratory motion through the housing to the gear train to eliminate the effect of static friction thereon.

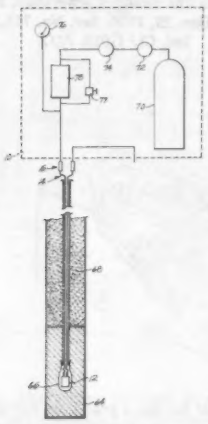
4,052,903
PRESSURE SENSOR
Petur Thordarson, Seattle, Wash., assignor to Thor Instrument Company, Inc., Seattle, Wash.
Filed Dec. 6, 1976, Ser. No. 747,488
Int. Cl.² G01L *7/08*
U.S. Cl. 73—406 **10 Claims**

1. A pressure sensor, comprising:
a support member having an axially elongated cylindrical end portion;
a cup-shaped elastomeric diaphragm mounted onto said support member and including an inboard portion and an outboard portion which is snugly fitted over the cylindrical end portion of said support member, said outboard portion having an outer surface which during use is subjected to a pressure to be measured;
means establishing a fluid seal between the inboard portion of said diaphragm and said support member, with the outboard portion of said diaphragm being free of attachment to the cylindrical end portion of said support member;
said support member including a gas delivery passageway therein and gas delivery port means extending outwardly

from said gas delivery passageway through the end portion thereof towards a wall part of the outboard portion of said diaphragm;

said support member also including a gas return passageway therein and gas return port means extending inwardly through the end portion thereof from another wall part of the outboard portion of said diaphragm to said gas return passageway;

with the outboard portion of said diaphragm normally overlying and substantially closing both the delivery port means and the return port means but being free to bulge outwardly during use in response to gas pressure within said passageway, an amount sufficient to open both of said port means and allow flow between the gas delivery port means and the gas return port means;



wherein said gas delivery port means comprises at least one axial gas delivery port extending outwardly from the gas delivery passageway to an end wall part of the outboard portion of said diaphragm, and further including at least one axially extending gas return port extending from another end wall part of the outboard portion of said diaphgragm inwardly into said gas return passageway;

wherein said gas delivery port means includes a plurality of radial ports extending from the gas delivery passageway to a cylindrical side wall part of the outboard portion of said diaphragm, and wherein the gas return port returns also includes a plurality of radial ports extending from the gas return passageway to a cylindrical side wall part of the outboard portion of said diaphragm; and

wherein the gas delivery ports and the gas return ports are substantially identical.

4,052,904

APPARATUS FOR OBTAINING A RELATIVELY PARTICLE-FREE SAMPLE OF A LIQUID

Jack Kushner, Lindenhurst, and Henry G. Zwirblis, Nesconset, both of N.Y., assignors to Delta Scientific Corporation, Lindenhurst, N.Y.

Continuation-in-part of Ser. No. 501,875, Aug. 30, 1974, Pat. No. 3,999,945. This application Nov. 28, 1975, Ser. No. 635,981

Int. Cl.[2] G01N *1/20*

U.S. Cl. 73—421 R **6 Claims**

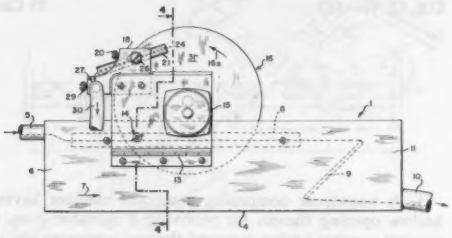
1. In an apparatus for obtaining a sample of a liquid and having a disc with a planar fluid wettable side surface and means for rotating said disc with the peripheral portion thereof submerged in said liquid; the imporvement comprising:

a. blade means having an edge bearing against said planar side surface, said blade means and edge extending downwardly beyond the periphery of the disc for collecting liquid removed from the side surface of the disc and directing it along the blade toward its lower end,

1. said blade bearing against the exposed side surface of the disc at a location where the side surface is moving in a direction having a downward component;

b. receiving means disposed at the lower end of said blade for receiving liquid collected on said blade at the lower end thereof;

c. a trough in which a portion of the liquid to be sampled flows in a predetermined direction and in which the disc is disposed in a plane generally parallel to said predetermined direction,



1. said disc being mounted for rotation in a direction causing the submerged portion thereof to move in said predetermined direction of flow of said liquid;

d. drive means connected to said disc to rotate it at a speed whereby the linear velocity of the submerged portion is lower than the velocity of the liquid flowing through said trough; and

e. baffle means disposed partially submerged beneath the surface of said liquid and disposed upstream of the disc for deflecting particles floating on the surface of said liquid away fom the surface of the disc.

4,052,905

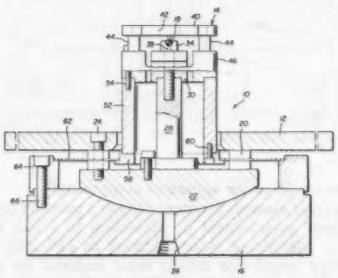
TIRE BALANCING TRANSDUCER

Albert E. Brendel, Lake Orion, and Stanley J. Rykwalder, Farmington, both of Mich., assignors to Lebow Associates, Inc., Troy, Mich.

Filed June 14, 1976, Ser. No. 695,664

Int. Cl.[2] G01M *1/12*

U.S. Cl. 73—483 **5 Claims**



1. An improved moment sensing device for use in a system for measuring the magnitude of moments about each of first and second mutually perpendicular axes, comprising:

1. a rigid hub;

2. a rigid annular ring member concentrically surrounding said hub and radially spaced therefrom relative to the third mutually perpendicular axis;

3. a rigid force transmitting member spaced along said third axis from said hub and ring member;

4. a first pair of bendable beams interconnecting said hub

with said force transmitting member, said beams being symmetrically located on opposite sides of said third axis and having a neutral axis coincident with said first axis and being bendable only to response to bending moments about said first axis;

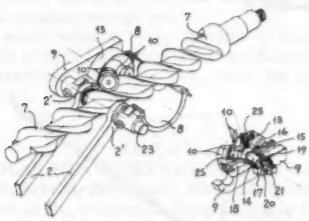
5. a second pair of bendable beams interconnecting said ring member with said force transmitting member, said beams being symmetrically located on opposite sides of said third axis and having a neutral axis coincident with said second axis and being bendable only in response to bending moments about said second axis;
6. said first and second pairs of bendable beams and said force transmitting member forming the only interconnection between said hub and said ring;
7. said first and second pair of bendable beams each being adapted to be instrumented to produce a signal proportional to their bending stress about their respective bendable axes;
8. whereby when moments about said first or second axes are applied to one of said hub or said ring, with the other of said hub or said ring providing a reaction moment, the appropriate pair or pairs of bendable beams will bend in such a manner to cause the instrumentation to produce a signal proportional to the magnitude of the applied moment.

4,052,906

MECHANISM FOR CONTROLLING THE MOTION OF THE WEFT CARRYING GRIPPERS IN LOOMS

Graziano Genini, Stabio, Switzerland, assignor to Albatex A.G., Vaduz, Liechtenstein

Filed Mar. 9, 1976, Ser. No. 665,335
Claims priority, application Switzerland, Mar. 10, 1975, 2991/75; Feb. 20, 1976, 2071/76
Int. Cl.² F16H *25/12*
U.S. Cl. 74—57 **5 Claims**



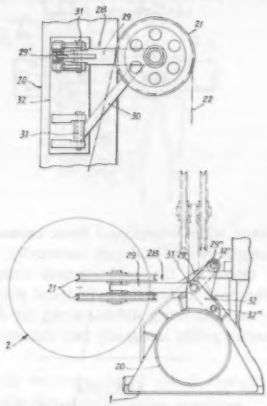
1. Mechanism for controlling the motion of weft carrying grippers in continuous weft feed looms, comprising a main rotary shaft of the loom, a crank carried by said shaft, a connecting rod pivotally secured to the crank, a slider pivotally connected to the end of the connecting rod remote from the crank, a screw passing through said slider and fixed at one end to a gear wheel that rotates in opposite directions to advance and retract a weft-carrying gripper, said screw being a cam screw with variable pitch that rotates about its own axis, means mounting said slider only for rectilinear motion parallel to the screw, and at least one pair of opposed rollers or wheels mounted for rotation on said slider about axes that are fixed relative to the slider, said slider wheels or rollers engaging said variable pitch screw to rotate said gear wheel with variable angular velocity upon rotation of said shaft.

4,052,907

PUMPING DEVICE FOR WELLS, SUCH AS OIL WELLS

Jöel Chardonneau, Orvault, and Claude Sable, Reze, both of France, assignors to Centre d'Etudes et de Realisations Industrielles de l'Atlantique (Ceria), Nantes, France

Filed Jan. 19, 1976, Ser. No. 650,264
Claims priority, application France, Jan. 23, 1975, 75.02075
Int. Cl.² F16H *27/02*
U.S. Cl. 74—89.22 **7 Claims**



1. An improved pumping apparatus for a well, comprising:
a vertically extending tubular mast;
at least one guide pulley having a horizontal axis of rotation;
means supporting said guide pulley outwardly from the mast, said supporting means being pivotally joined to said mast about a vertical axis to permit said pulley to be selectively positioned in alignment with a shaft of said well;
means for locking said supporting means in positions in and out of alignment with said shaft;
a driving plant;
a flexible connection extending from said driving plant and passing over said guide pulley, said connection being selectively joined to pumping means immersed within the well; and
means joined to said driving plant for counterbalancing forces exerted on said flexible connection.

4,052,908

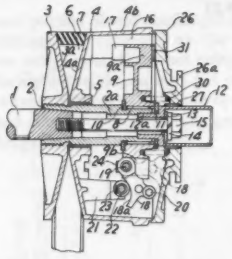
V-BELT TYPE AUTOMATIC TRANSMISSION DRIVE CLUTCH DEVICE

Izumi Takagi, and Haruo Kitai, both of Akashi, Japan, assignors to Kawasaki Heavy Industries, Ltd., Japan

Filed Jan. 13, 1976, Ser. No. 648,807
Claims priority, application Japan, Jan. 14, 1975, 50-7583[U]
Int. Cl.² F16H *55/52*
U.S. Cl. 74—230.17 E **1 Claim**

1. In a drive clutch device for the V-belt type automatic transmission having a driving shaft, a stationary sheave having a sheave surface and fixed to the driving shaft, a movable sheave having a sheave surface and a hollow cylindrical portion which extends in the opposite direction from the sheave surface and has the free end thereof open, said movable sheave being rotatably and axially slidably mounted on the driving shaft with the sheave surface thereof opposed the stationary sheave, said sheave surface of the movable sheave and said sheave surface of the stationary sheave defining therebetween a V-shaped groove in which a V-belt is positioned, a bracket fixed to said driving shaft for transmitting rotation of the driving shaft to said movable sheave, a spring interposed between said bracket and said cover in for biasing the movable sheave in a direction away from the stationary sheave, a roller rotat-

ably mounted on said movable sheave, and a cam weight acting as a centrifugal weight and pivotally supported on said bracket for swinging movement radially outwardly of said driving shaft and having a concave cam surface in engagement with said roller for urging said movable sheave to slide along said driving shaft against the force of said spring toward said stationary sheave when centrifugal force caused by rotation of said cam weight swings said cam outwardly, thereby varying the pulley diameter; the improvement comprising a cover enclosing the open end of the cylindrical portion of the movable sheave and also being slidable along the driving shaft, and having a starter pulley integrally cast thereon.

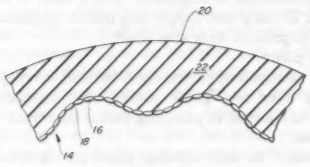


4,052,909

POWER TRANSMISSION BELT

John Craig Warner, Ithaca, N.Y., and Mark William Gravel, Keokuk, Iowa, assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Sept. 13, 1976, Ser. No. 722,938
Int. Cl.² F16G 1/00
U.S. Cl. 74—231 P **4 Claims**



1. A power transmission belt which comprises an elastomeric body and a longitudinally flexible and laterial stiff member bonded to said elastomer of said body, said member being of a plastic and having alternate relatively thin laterally extending portions and relatively thick and rod-like laterally extending portions, said member being of one piece and of a single plastic, said relatively thin portions acting as living hinges providing the longitudinally flexibility of the belt while said rod-like portions provide the lateral stiffness thereof.

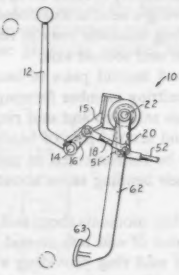
4,052,910

GOVERNOR AND DECELERATOR CONTROL LINKAGE

Arthur E. Olt, Jr., Pekin, and Richard Vanrossem, Canton, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 23, 1976, Ser. No. 716,845
Int. Cl.² G05G 1/14, 11/00
U.S. Cl. 74—482 **7 Claims**

1. An engine control linkage comprising:
a housing;
a first shaft rotatably mounted in the housing;
a second shaft rotatably mounted in the housing;
coupling means associated with the housing and associating the first shaft with the second shaft for allowing rotation of the second shaft relative the housing only upon rotation of the first shaft;
first lever means fixedly associated with the second shaft for rotation therewith;
second lever means rotatably mounted about the second shaft;
third lever means rotatably mounted about the first shaft;
said first and third lever means each engageable with the second lever means for rotating said second lever means in a first rotative direction relative the second shaft; and
resilient means associated with the second shaft and the first and second lever means for urging the second lever means in a second rotative direction to engage the first lever means in a predetermined position relative the first lever means.

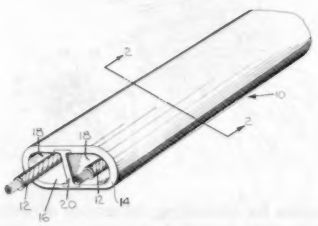


4,052,911

CABLE CORE CONDUIT

George Feldstein, Lansdale, Pa., assignor to Incom International Inc., Pittsburgh, Pa.

Continuation of Ser. No. 361,780, May 18, 1973, abandoned.
This application Feb. 6, 1975, Ser. No. 547,538
Int. Cl.² F16C 1/10
U.S. Cl. 74—501 R **10 Claims**



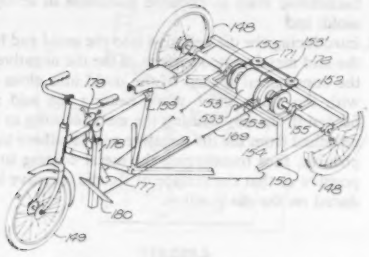
1. A push-pull cable core conduit for a motion transmitting system comprising an outer casing of resilient plastic material having an inner plastic wall, said casing having a central longitudinally extending cavity, said cavity separated by a resilient metallic strength member into a plurality of longitudinally extending pathways each of which pathways are bounded by portions of the metallic strength member and the inner plastic wall, a like plurality of motion transmitting cable cores positioned severally in the pathways and spaced from the resilient metallic strength member and from the plastic wall of the outer casing for slidable movement therein, said inner plastic wall of said outer casing providing the bearing surfaces for said slidable cores.

4,052,912

PEDAL ACTUATED DRIVE MECHANISM

Peter Vukelic, 924 Milwood Ave., Venice, Calif. 90291

Filed May 27, 1975, Ser. No. 580,748
Int. Cl.² G05G 1/14
U.S. Cl. 74—512 18 Claims



1. A drive assembly comprising:

a foot actuated structure mounted to swing about an axis alternately in opposite directions, and including a pedal against which force is exerted by a user's foot to swing the structure about said axis;

a movable member to be driven by said structure;

mechanism for driving said member in response to oscillation of said foot actuated structure in said opposite directions about said axis;

means connecting said mechanism operatively to said structure for actuation thereby at a location offset from said axis, and mounted for shifting movement in a relation moving the operative connection between said structure and said mechanism toward and away from said axis to thereby vary the effective length of lever arm of said structure and correspondingly alter the transmission ratio of said drive assembly;

a second of said foot actuated structures swinging oppositely from said first structure;

second connecting means connecting said mechanism to said second structure for actuation thereby and in a relation enabling shifting movement of the effective point of operative connection of said mechanism to said second structure toward and away from the axis about which said second structure swings; and

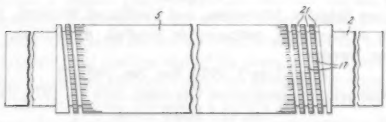
control means actuable by an operator to simultaneously shift the point of connection of said mechanism to both of said structures toward or away from the axes of said structures.

4,052,913

POLAR WEAVE FLYWHEEL ASSEMBLY

Frederick E. Schultz, Devon, and Albert M. Garber, Wynnewood, both of Pa., assignors to General Electric Company

Filed Dec. 23, 1975, Ser. No. 643,906
Int. Cl.² G05G 1/00, 3/00
U.S. Cl. 74—572 17 Claims



1. A flywheel comprising:

a. an inner hub; and

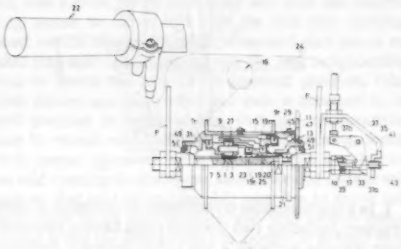
b. an outer composite portion woven in intimate locking engagement with said hub, said composite comprising a plurality of three mutually orthogonal bundles of elements with said bundles of elements being respectively aligned and positioned in directions parallel to polar coordinate axis.

4,052,914

INTERNALLY ACCOMMODATED SPEED CHANGE MECHANISM APPLICABLE TO A BICYCLE, ETC.

Kazuo Nakajima, Kodaira, Japan, assignor to Xenoah Co., Hagashi Yamato, Japan

Filed Apr. 10, 1975, Ser. No. 566,722
Claims priority, application Japan, Jan. 25, 1975, 50-10724
Int. Cl.² F16H 3/44
U.S. Cl. 74—750 B 5 Claims



1. An internally accommodated speed change mechanism for a bicycle or the like, comprising:

a hub axle,

a hub body freely rotatable on said hub axle;

first and second sun gears each of which is mounted in axially fixed position on said hub axle and each of which is selectably rotatable relative to said hub axle;

a first planetary gear meshing with said first sun gear;

a second planetary gear meshing with said second sun gear;

a first ring gear meshing with said first planetary gear;

a second ring gear meshing with said second planetary gear;

a first carrier supporting said first planetary gear for free rotation and being integral with said second ring gear

a second carrier supporting said second planetary gear for free rotation and being integral with said first sun gear

a drive sprocket rotatably mounted relative to said hub axle;

an input member mounted on said hub axle, to be rotatably driven by said driving sprocket;

a first speed change rod supported for axial movement relative to said hub axle and being selectably axially movable from a first position inwardly to a second or third axial position;

a second speed change rod supported for axial movement relative to said hub axle and being selectably axially movable to either a first or second axial position;

means associated with said second speed change rod to fix said first sun gear to said hub axle and to release said second sun gear for rotation about said hub axle when said second speed change rod is in said first position, and to fix said second sun gear to said hub axle and to release said first sun gear for rotation about said hub axle when said speed change rod is in said second position;

a sleeve axially movable on said hub axle in response to said axial movement of said first speed change rod and rotatably driven by said input member;

a first ratchet rotatably driven by said input member and operative to rotate said first ring gear;

a second ratchet mounted on said first ring gear in position to drivingly engage said hub body when said first speed change rod is in either said second or third axial position, and to be disengaged from said hub body in said first axial position;

a third ratchet mounted on said second ring gear in position to engage said hub body; and

a fourth ratchet carried by said sleeve and engagable to

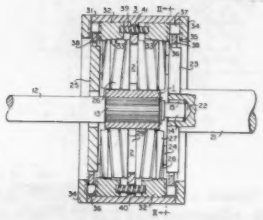
rotate said first carrier only when said first speed change rod is in said third position.

4,052,915

TRACTION ROLLER TRANSMISSION

Charles E. Kraus, Austin, Tex., assignor to Excelermatic, Inc., Leesburg, Va.

Filed July 12, 1976, Ser. No. 704,438
Int. Cl.[2] F16H *13/06, 13/10, 13/14*
U.S. Cl. 74—798 **6 Claims**



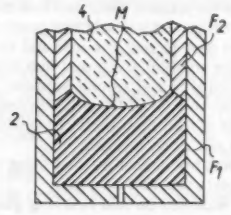
1. In a traction roller transmission comprising: a traction ring structure including two traction rings having opposite conical inner traction surfaces; a sun roller centrally disposed within the traction ring structure and having a circumferential traction surface spaced from the traction surfaces of said traction rings; planetary traction rollers supported in the space between the sun roller and the traction ring structure, each of said traction rollers having a cylindrical central section in engagement with said sun roller and axially outer conical sections in engagement with the conical traction rings, and engagement means for forcing said traction rings toward each other and into firm compressive engagement with the traction rollers and said traction rollers into frictional engagement with said sun roller; the improvement residing in the cone angle of said conical traction ring surfaces and the conical surface sections of the traction rollers being relatively small so as to prevent substantial spin at the conical surfaces of the traction rollers and the traction rings and separating means being disposed between the traction rings for axially forcing said traction rings apart for disengagement of said traction rings from said traction rollers.

4,052,916

PROCESS FOR MAKING A DIE PUNCH

Paul Feneberg, Planegg, Germany, assignor to AGFA-Gevaert AG, Leverkusen, Germany

Filed Mar. 4, 1976, Ser. No. 663,815
Claims priority, application Germany, Mar. 27, 1975, 2513773
Int. Cl.[2] B21K *5/20*
U.S. Cl. 76—107 R **6 Claims**



1. A process for making a concave die or die punch of the type required in the formation of highly specific silicone elastomer contact lenses of negative power of refraction in which the curvature of the marginal zone must be greater than the curvature of the central zone,

the said process comprising

a. making a convex die negative of desired differential curvature from gals or a vitreous ceramic;

b. providing the negative with a metal coating of a thinness to permit it fully to conform to the surface curvatures of the die negative;

c. placing a concave die positive consisting of a heat hardenable resin in uncured condition in an open top mold; and

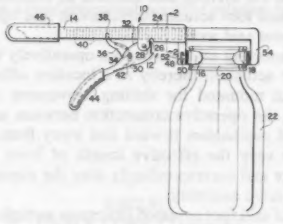
d. introducing the die negative into the mold and bringing the said metal coated surface of the die negative within the constrained spaced of the mold into close contact with the die positive while heating the said resin to harden it, thereby causing the metal coating to become detached from the die negative and to adhere to the die positive, thus transferring the metal coating to the die positive so that the surface of the die negative is reproduced on the die positive.

4,052,917

JAR AND BOTTLE CAP OPENER

Beryl Gee, Scarborough, Canada, assignor to Beryl Gee, Scarborough, Canada

Filed Jan. 21, 1977, Ser. No. 761,061
Int. Cl.[2] B67B *7/18*
U.S. Cl. 81—3.42 **5 Claims**



1. A jar and bottle cap opener comprising:

an elongated handle having a depending lug at the front thereof;

a slide on said handle having a depending lug at the front thereof;

a slot in the side of each of said lugs, the slot on one of said lugs being on a side opposite to the slot on the other of said lugs;

a pair of arcuate jaws for gripping therebetween a cap on a bottle or jar;

means on each of said jaws slidably received within one of said slots for mounting a jaw on each of said lugs; and

means pivotably mounted on said slide for urging said jaws into gripping relation with a cap on a bottle or a jar and for locking said jaws in gripping relation.

4,052,918

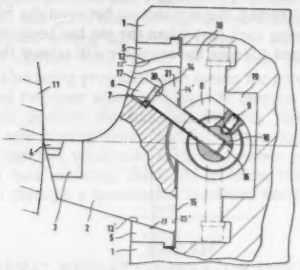
TOOL HEAD MOUNTING ARRANGEMENT FOR A LATHE

Hermann Schmitz, Mettmann, and Ferdinand Wellisch, Neuss, both of Germany, assignors to Sandvik Aktiebolag, Aandviken, Sweden

Filed July 7, 1976, Ser. No. 703,223
Claims priority, application Germany, July 25, 1975, 2533393
Int. Cl.[2] B23B *29/00*
U.S. Cl. 82—36 R **10 Claims**

1. A tool heading mounting arrangement in a turning machine of the type having a carrier and tool head clamped against seating surfaces therein, said tool head being adjustable in position relative to the workpiece, said carrier containing an opening for receiving said tool head, said opening including an upper seating surface and a lower seating surface against which

said tool head rests, a rotatable clamping means provided in the carrier for retaining said tool head in place, said clamping means comprising a body having a transversely running threaded bore for receiving a clamping screw for clamping the



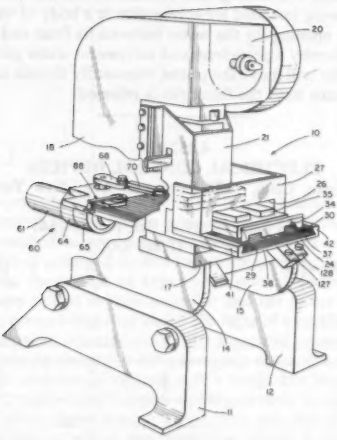
tool head, said body being mounted rotatably in the carrier, said carrier being provided with a recess dimensioned so that the clamping screw can be moved selectively into upper and lower positions in which it is displaced from the guide opening in the carrier to permit insertion and removal of a tool head.

4,052,919

MOTOR-DRIVEN BOLSTER PLATE

Patrick G. McKissack, Gary, Ind., assignor to The Anderson Company, Gary, Ind.

Filed Sept. 15, 1976, Ser. No. 723,433
Int. Cl.² B26D 7/24
U.S. Cl. 83—205 **10 Claims**



1. In a press including a supporting frame, a bed mounted on the frame, a bolster plate, a first die member carried by the bolster plate, means for mounting the bolster plate on the bed for sliding movement between a work position in the press and a withdrawn load position out of the press, a ram, a second die member carried by the ram, means for mounting the ram on the frame for movement between a raised open position and a lowered closed position, and means for reciprocating the ram between its raised and lowered positions, the press operating to move the ram to its lowered position with the second die member in engagement with the first die member when the bolster plate is positioned at its work position, the improvement comprising:

a drive assembly for reciprocating the bolster plate between its work and withdrawn positions, said drive assembly including a constant speed motor, a clutch, and a brake;

a crank having one end connected to said drive assembly so that the other end is rotated circuitously about said one end;

a connecting arm between the bolster plate and said other end of said crank; and

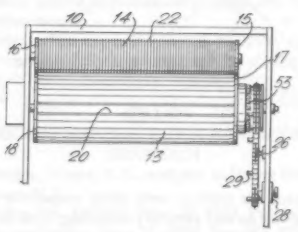
a bolster plate positioning control mechanism including a reciprocable shot pin carried by the frame, means for reciprocating said shot pin, the bolster plate having an opening for receiving said shot pin, said opening being aligned with said shot pin when the bolster plate is at its work position, first switch means operated when the bolster plate is at its work position to activate said brake and disengage said clutch to end movement of said bolster plate, said switch means activating said shot pin reciprocating means to move said shot pin into said opening, second switch means operated when said shot pin is extended into said opening to actuate the ram reciprocating means to move the ram to its lowered position, third switch means operated when the ram is returned to its raised position to activate said shot pin reciprocating means to retract said shot pin from said opening, fourth switch means operated when said shot pin is retracted from said opening to deactivate said brake and engage said clutch so that said drive assembly operates to move said bolster plate to its load position and fifth switch means operated when the bolster plate is moved to its load position to activate said brake and disengage said clutch to terminate movement of said bolster plate.

4,052,920

MACHINE FOR PERFORATING HIGH DENSITY POLY-ETHYLENE FILM OR THE LIKE FILM MATERIAL

Vernon Gerald Ralph Dixon, Wisborough Green, England, assignor to Paclene Company Limited, Ennis, Ireland

Filed Aug. 31, 1976, Ser. No. 719,482
Claims priority, application Ireland, Sept. 1, 1975, 1907/75
Int. Cl.² B26F 1/24
U.S. Cl. 83—337 **5 Claims**



1. A machine for perforating high density polyethylene film material or the like, comprising a feed roller for supplying film material to be perforated from a roll thereof, cooperating male and female rollers between which film material from the feed roller passes for perforation, and a take up means for receiving the perforated film material, the male roller carrying for rotation therewith a plurality of circumferentially spaced blade members, means for mounting each blade for reciprocal motion relative to the surface of the male roller between a first position wherein the blade member projects from the surface of the male roller and a second position wherein the blade member is retracted into the male roller, means for biasing each blade member into one of its first and second positions, an independently operable actuating member linked respectively to each blade member for forcing the associated blade member into the other of its first and second positions in opposition to the biasing means, an indexing mechanism including a plurality of selectively located actuating means mounted for movement

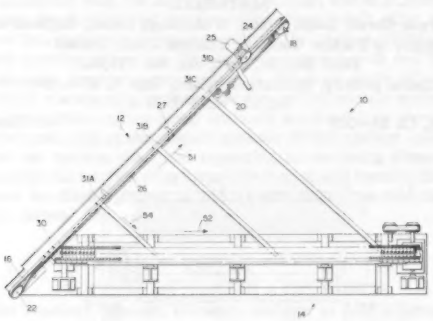
in coordination with the rotation of the male roller and arranged to cooperate with the actuating members of the blade members in such manner that upon rotation of the male roller the actuating means are brought successively into engagement with selected actuating members whereby the associated blade members are successively forced into their other positions, means for causing the actuating means to remain in engagement with the actuating members during a partial rotation of the male roller and for thereafter being successively disengaged from the actuating members to allow the biasing means to return the blade members to their one positions, the angular distance over which the actuating means remain in engagement with the selected actuating members being chosen such that, in the vicinity of the female roller, the blade members linked with the selected actuating members are in their projecting position for perforation of film material passing between the male and female rollers and the blade members linked to the non-selected actuating members are in their retracted position, recesses within the female roller which are entered by the selected blade members during perforation of the film, and means for adjusting the indexing means whereby the spacing and number of actuating means may be changed to vary the selection of blade members.

4,052,921

APPARATUS FOR REMOVING WEBS FROM CARTRIDGES

Gurdip Singh Sethi, Rochester, and Thomas Walter Cole, Avon, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 29, 1976, Ser. No. 737,259
Int. Cl.² B26D *7/06*
U.S. Cl. 83—409 **9 Claims**



1. Apparatus for pulling webs from respective cartridges, each web having an end portion protruding from its respective cartridge, said apparatus comprising:

means for advancing the cartridges in a first direction; and

means for engaging the end portion of each web and for advancing the end portion so engaged in a second direction at an acute angle with respect to said first direction,

whereby as the cartridges and the respective web end portions are advanced along said first and second directions respectively, each web is pulled from its respective cartridge.

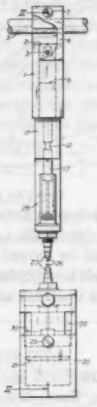
4,052,922

HYDRAULICALLY-ACTUATED CABLE CUTTER

Robert A. Bub, Gibsonia, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Dec. 1, 1976, Ser. No. 746,399
Int. Cl.² B26D *5/12*
U.S. Cl. 83—639 **10 Claims**

1. A hydraulically actuated cable cutter, comprising a cable holder, a cable cutting member in the holder adapted to be driven forward to cut a cable, an explosive charge for driving said member forward, a firing pin slidably mounted in said holder behind the charge for detonating it, a spring urging the pin forward toward the charge, a firing pin retractor slidably mounted in said holder behind said pin and detachably connected with the pin for retracting it a predetermined distance to compress said spring, the connection between the retractor and firing pin being such that when the pin has been retracted said predetermined distance the retractor will release the pin, a



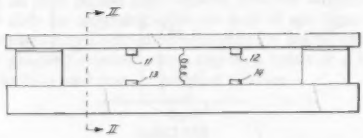
cylinder separate from the cable holder spaced behind said retractor and having a front end and a closed rear end, a piston in the cylinder normally spaced from its opposite ends, tension means extending through an opening in the front end of the cylinder and connecting said retractor with the piston, the cylinder being intended for submersion in a body of water and having an opening for the water between its front end and the piston, whereby a predetermined increase in water pressure at the cylinder will move the piston rearwardly therein to retract said retractor until the firing pin is released.

4,052,923

ELECTRICAL CONTROL DEVICES

James Myron Cohn, 1125 Lexington Ave., New York, N.Y. 10021

Filed June 22, 1976, Ser. No. 698,644
Int. Cl.² G10H *3/00*
U.S. Cl. 84—1.07 **11 Claims**



1. An electrical control device comprising a base member, an elongate support member mounted to be movable transversely of its length with respect to said base member, biasing means to bias the support member against movement away from a null position in one direction transversely of its length, and a potentiometer comprising an elongate resistive member supported by and extending along the length of the support member and a sensing electrode which can be applied to the resistive member at a position intermediate its ends when said ends are connected to opposite respective poles of a voltage source to tap off a voltage which is selectively variable by varying the position along the support member at which the sensing electrode is applied to the resistive member, said resistive member being so arranged with respect to said support

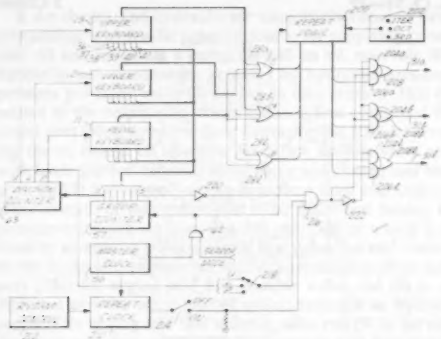
member that application of the sensing electrode to the resistive member tends to bring about movement of said elongate member with respect to said base member in said one direction, in opposition to said biasing means, and the device also comprising position pick-up means having a first part connected to said support member and a second part connected to said base member, said parts being arranged and connected to generate an electrical analog signal dependent on the position of said support member with respect to said base member, and the device also being provided with means for generating a predetermined response when said support member is moved from said null position through an initiating threshold position against said biasing means and for terminating said predetermined response when said support member is ruturned from beyond said initiating threshold position towards said null position through a termination threshold position.

4,052,924

INTERVAL REPEAT GENERATOR FOR KEYBOARD MUSICAL INSTRUMENT

Ralph Deutsch, and Leslie J. Deutsch, both of Sherman Oaks, Calif., assignors to Kawai Musical Instrument Mfg. Co. Ltd., Hamamatsu, Japan

Filed Aug. 9, 1976, Ser. No. 712,744
Int. Cl.² G10H *1/02*
U.S. Cl. 84—1.24 **9 Claims**



1. In a polyphonic tone synthesizer in which individual notes are generated in response to pressing selected keys, the keys being arranged in groups corresponding to octaves and the groups being arranged in divisions corresponding to separate keyboards, the groups of keys in the several divisions being repetitively pulsed in time sequence and the status of all the keys in a group being read out in the form of a parallel pattern of output pulses coincident with the sequential pulsing of each of said groups, apparatus for generating notes in a repetitive pattern in response to operation of a single key in a selected keyboard, comprising: a repeat signal generator for generating a repeat clock signal having a repetitive rate that is different than the rate at which any particular group is repetitively pulsed, and switching means operated by said repeat signal generator for periodically interrupting said sequence of parallel patterns of output pulses during the normal time period for the associated group of keys.

4,052,925

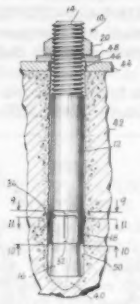
EXPANSION STUD

Edward P. McCarthy, York, Pa., assignor to U.S. Expansion Bolt Company, York, Pa.

Filed Nov. 5, 1975, Ser. No. 629,050
Int. Cl.² F16B *13/06*
U.S. Cl. 85—77 **8 Claims**

1. An expansion stud which is adapted to be inserted into, and to expand in, a bore hole in a concrete anchorage or the like, said expansion stud comprising:

a. a cylindrical shank,
b. the upper end of said cylindrical shank being threaded for engagement with a nut,
c. the lower end of said shank having a wedge tip which is conically tapered throughout its length up to said lower end of said shank, said wedge tip oriented with its smaller end directed upwardly and joined directly to the shank, its larger end directed downwardly away from the shank, and the maximum diameter of said wedge tip being substantially no greater than the diameter of said shank,
d. an expansion sleeve mounted, when in unexpanded state, on the smaller upper end of said wedge tip,
e. said expansion sleeve, in unexpanded state, having a conically tapered axial bore the conical angle of which is substantially the same as the conical angle of said wedge tip, and a substantially cylindrical outer configuration having a diameter which corresponds, substantially, to the diameter of the shank,
f. whereby causing the cylindrical shank and the wedge tip to move upwardly and axially relative to the expansion sleeve causes expansion thereof in opposite radial directions perpendicular to the shank axis,
g. the length of the wedge tip exceeding the length of the expansion sleeve approximately twice the length of the expansion sleeve,
h. whereby, when expanded to full capacity, the expansion sleeve remains fully supported on the wedge tip.

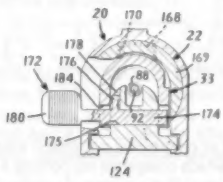


4,052,926

CHARGING HANDLE FOR A GAS-OPERATED SHOTGUN

James Tollinger, Ithaca, N.Y., assignor to Ithaca Gun Company, Inc., Ithaca, N.Y.

Division of Ser. No. 525,072, Nov. 19, 1974, Pat. No. 4,014,247.
This application Dec. 22, 1976, Ser. No. 753,189
Int. Cl.² F41C *19/14*
U.S. Cl. 89—1 K **2 Claims**



1. In a gas operated firearm having a receiver, a barrel removably mounted in said receiver, a slide, and a bolt operated by said slide, the improvement comprising:

a charging handle having a body portion with a non-circular cross-section;

means, including an upper edge, defining a recess in said bolt through which said charging handle extends;

means in said slide defining a laterally extending bore having a non-circular cross-section alike the cross-section of said charging handle body portion;

a vertical step in said body portion having an upper extremity normally extending within said bolt above said upper edge;

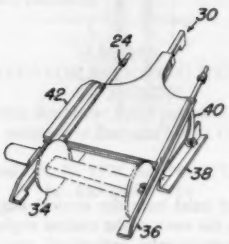
said bolt being pivotally mounted in said receiver such that, when said barrel is removed from said receiver, said bolt may be tilted upward to raise said upper edge above the upper extremity of said step, whereby said charging handle may be withdrawn from said slide, bolt and receiver.

4,052,927

AUTOROTOR LAUNCHING SYSTEM

Abraham Flatau, Edgewood, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 1, 1966, Ser. No. 578,958
Int. Cl.² F41F *5/00*
U.S. Cl. 89—1.5 R **15 Claims**



1. An autorotor launcher adapted to be mounted in an airborne vehicle, comprising in combination:

a. means to rotate said autorotor to a predetermined angular velocity prior to ejection from said vehicle,

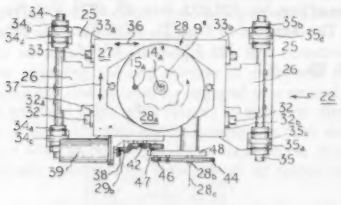
b. means to launch said rotating autorotor from said airborne vehicle, whereby said autorotor body is stabilized and glides to the target area in a predetermined trajectory.

4,052,928

CAM-TYPE GEARING AND THE LIKE

Michel A. Pierrat, and Carl J. Holt, Jr., both of Andover, Mass., assignors to COMPUDRIVE Corporation, North Billerica, Mass.

Filed Feb. 18, 1976, Ser. No. 658,887
Int. Cl.² B23F *5/02, 5/20*
U.S. Cl. 90—3 **8 Claims**



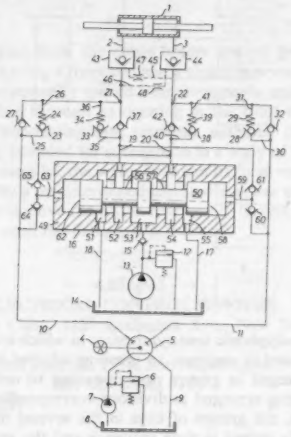
8. The method of contouring peripheral lobes of a cam-type gear or the like which comprises supporting a cam blank on a movable mount, providing a source of rotational motive power in fixed relation to and movable with the movable mount, using motive power from the source to rotate the cam blank on the mount in one angular direction about a first axis normal thereto at a first angular rate while restraining rotation of the mount in relation to a base by restricting the movements of the mount to two mutually-perpendicular paths normal to the first axis, using motive power from the same source movable with the mount to develop forces relative to the base which orbit the first axis and the cam blank and the mount along a circular path lying in a plane normal to the first axis, as allowed by movements of the mount along said mutually-perpendicular paths, and at a second angular rate which is an integral multiple of the said first rate and synchronous therewith, said circular path of the orbiting having a diameter which is small in relation to the diameter of the cam blank and which is equal to the depth of lobes being contoured, and removing material from a periphery of the cam blank at a fixed position in relation to which the cam blank is simultaneously orbited and rotated in the opposite directions, the removing of material being performed along a path having a curvature of substantially the same radius as that of circular-curvature cam surfaces which are to mesh with the lobes of the cam-type gear.

4,052,929

HYDRAULIC CONTROL MEANS, ESPECIALLY A STEERING MEANS

Johannes Vagn Baatrup, Sonderborg, and Thorkild Christensen, Nordborg, both of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Continuation of Ser. No. 438,004, Feb. 6, 1974, abandoned. This application June 20, 1975, Ser. No. 588,623
Claims priority, application Germany, Feb. 7, 1973, 2305798
Int. Cl.² F15B *13/042*
U.S. Cl. 91—29 **2 Claims**



1. A power steering assembly comprising a motor having expansible chamber means, first and second pressurized fluid source means, manually controlled rotary metering means controlling said first source means, control and power passage means extending respectively in parallel from said two source means to a junction upstream from said chamber means, pilot operated reciprocating comparator valve means in said power passage means having a pressure operated movable valve member for modulatingly controlling the flow of pressurized fluid in said power passage means to said chamber means, first branch passage means between said control passage means and a first pressure responsive portion of said comparator valve means for pilot fluid pressure biasing said valve member in an opening direction, second branch passage means between said power passage means downstream of said comparator value means and a second pressure responsive portion of said comparator valve means for fluid pressure biasing said valve member in a closing direction, first and second throttle check valves biased by resilient means respectively, in said control and power passage means between said branches and said junction, said throttle valves presenting selected resistances to flow to

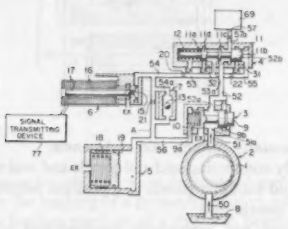
obtain selected predetermined flow relationships between the respective fluid flows in said control and power passage means.

4,052,930

ELECTRIC AND HYDRAULIC SERVOMECHANISM CONTROLLING DEVICE

Takeo Hiramatsu, Kyoto, and Yasuhiko Fujita, Moriyama, both of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Filed May 15, 1975, Ser. No. 577,765
Claims priority, application Japan, May 16, 1974, 49-54850
Int. Cl.[2] F15B *11/08, 13/043*
U.S. Cl. 91—446 2 Claims



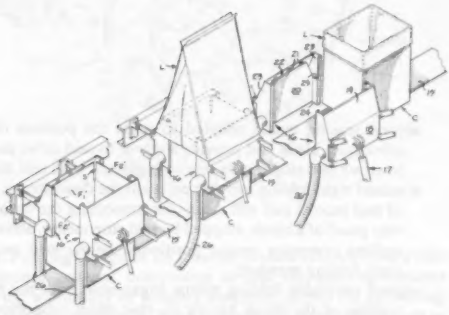
1. An electric and hydraulic servomechanism control device comprising: a hydraulic pressure source for supplying pressurized oil and including a pump (2) and an oil reservoir (8); a hydraulic servomechanism actuated by hydraulic pressure; a pressure governor valve (3) having an inlet portion (51*a*) connected to the output side of said pump, a first controlled flow outlet port (52*a*), an excess flow outlet portion EX1 for returning the oil to said oil reservoir (8), a first slidable valve rod 9 with lands thereon disposed for opening and closing said outlet port, (EX1) for controlling the fluid flow from said inlet port (51*a*) to each of said outlet port (52*a*, EX1) and having two pressure-receiving surfaces (9*a*, 9*b*) one (9*b*) of which is defined by an annular portion of said first valve rod and responds to the hydraulic pressure in said first controlled flow outlet port (52*a*) for urging said first slidable valve rod (9) in one direction and the other (9*a*) of which responds to hydraulic pressure for urging said first slidable valve rod (9) in the other direction, and first means (10) for pressing said first slidable valve rod (9) in said other direction; a change-over and pressure-reducing valve 4 having an inlet port (52*b*) connected to said first controlled flow outlet port (52*a*), an outlet port (57*a*) connected to said hydraulic servomechanism, two exhaust ports (31, 32) for returning the oil to said oil reservoir (8), a second controlled flow outlet port (53*a*), a second slidable valve rod (11) with multiple lands thereon slidably disposed for selectively changing the flow direction from said inlet port (52*b*) to said outlet port (57*a*) or said second controlled flow outlet port (53*a*) and having a pressure-receiving surface 11*b* which responds to the hydraulic pressure in said second controlled flow outlet port (53*a*) for urging said second slidable valve rod (11) in one direction, and second means (12) for pressing said second slidable valve rod (11) in the other direction which is opposite to the direction in which the hydraulic pressure fed from said second controlled flow outlet port (53*a*) is applied thereto; a signal transmitting device (77) for transmitting electrical signals; a solenoid valve (6) having an orifice (15) connected to said oil reservoir (8) and which is opened and closed according to said electrical signals applied thereto from said signal transmitting device (77); and a hydraulic passage A interconnecting a hydraulic pressure supplying passage (56) leading to said hydraulic pressure-receiving surface 9*a* with said orifice (15) of said solenoid valve (6) and with said second controlled flow outlet port (53*a*); whereby when said solenoid valve (6) closes said orifice (15) and the hydraulic pressure in said hydraulic passage A rises, said second slidable valve rod (11) of said change-over valve (4) slides to a first position where the force applied on said second slidable valve rod (11) by the hydraulic pressure of said second controlled flow outlet port (53*a*) balances with the force applied by said second means (12) thereby communicating said inlet port (52*b*) and said outlet port (57*a*) connected to said hydraulic servomechanism and controlling the hydraulic pressure in the hydraulic passage A to a given level lower than the hydraulic pressure in said first controlled flow outlet port (52*a*) by discharging the excess oil in said hydraulic passage A through one 32 of said two exhaust ports of said change-over valve (4), said pressure governor valve (3) raises the hydraulic pressure in said first controlled flow outlet port (52*a*) when the hydraulic pressure in said hydraulic passage (A) rises, and said second slidable valve rod (11) slides to a second position when said solenoid valve (6) opens said orifice (15) to permit the oil to flow out of said hydraulic passage (A) to lower the hydraulic pressure therein thereby disconnecting said inlet port (52*b*) from said outlet port (57*a*) to effect discharge of the oil from said hydraulic servomechanism through one (31) of said two exhaust ports of said change-over valve (4) thereby communicating said inlet port (52*b*) with said second controlled flow outlet port (53*a*).

4,052,931

METHOD AND APPARATUS FOR LINING CONTAINERS

Hugh B. Morse, San Jose; Robert B. Johnson, Santa Clara, and Helmut E. W. Masch, San Jose, all of Calif., assignors to Helmut E. W. Masch, San Jose, Calif.

Filed Sept. 24, 1976, Ser. No. 726,269
Int. Cl.[2] B31B *7/74*
U.S. Cl. 93—36.01 18 Claims



1. A method for applying a bag-type liner interiorly of a container comprising the steps of

inserting an open end of said liner over an open end of said container, and

creating a pressure within said container from a top portion thereof and within said liner which is less than ambient pressure exteriorly thereof and simultaneously drawing said liner within said container.

4,052,932

FOLDING MACHINE FOR BOX BLANKS

Johannus Martinus Huiskes, Borne, Netherlands, assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Apr. 6, 1976, Ser. No. 674,293
Claims priority, application Netherlands, Apr. 1, 1975, 7503837
Int. Cl.[2] F01B *19/00*
U.S. Cl. 93—49 R 11 Claims

1. Apparatus for folding the front and rear panels of a succession of advancing box blanks comprising:

first pull roll means for serially advancing said blanks,

first moveable folding means downstream from said first pull roll means for partially folding said front panel upwardly

along a front transverse score line in each of said blanks succeedingly engaging said first moveably folding means;

drive means for moving said first moveable folding means into operable contact with said front panel;

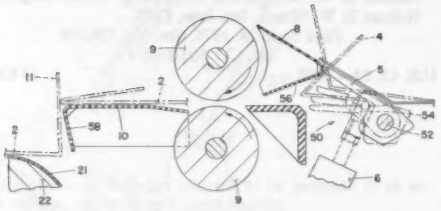
sensing means adapted to sense the position of said advancing blanks, and provide a signal for actuating said drive means for moving said first moveable folding means into operable contact with said front panel of said advancing blanks;

a first rigid folding member downstream from said first moveable folding means for engaging the partially folded front panel and bending it further toward the body portion of the blank being folded, said first pull roll means continuing to advance said blank;

second pull roll means downstream from said first rigid folding member for continuing advancement of each successive blank and for pressing said first panel firmly against the body portion of said blank;

stop means downstream from said second pull roll means for temporarily stopping the advance of each succeeding blank by engaging the fold line along which said first panel is folded;

drive means for moving said stop means into and out of engagement with said stop means;



second sensing means adapted to sense the position of an advancing blank and provide a signal to said drive means to move said stop means into engagement with said blank;

a second rigid folding member adjacent the downstream side of said second pull roll means for supporting the unfolded rear panel of a blank, stopped by said stop means, above an endless conveyor means positioned below said second rigid folding member;

second moveable folding means engageable with the body portion of the blank having its rear panel supported by said rigid folding member adjacent a rear transverse score line in said blank, for urging said body portion against said conveyor means to fold said rear panel upwardly by virtue of its engagement with said second rigid folding member, said rear panel being folded forward and downward against the body portion of said blank by the advance of the next succeeding blank engaging the upwardly folded rear panel; and

third sensing means adapted to sense the folding of said rear panel of said blank engaged by said stop means and provide a signal to move said stop means out of engagement with said blank.

4,052,933

TRAY FORMING METHOD

Thomas B. Royal, Homestead, Fla., assignor to International Paper Company, New York, N.Y.

Division of Ser. No. 526,826, Nov. 25, 1974, Pat. No. 3,978,774. This application July 15, 1976, Ser. No. 705,619

Int. Cl.² B31B *1/46*

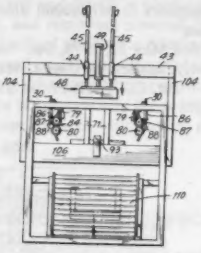
U.S. Cl. 93—51 M **2 Claims**

1. The method of forming a tray having horizontal shoulder panels from a flat blank having a bottom panel, side panels and end panels foldably connected to opposite edges of said bottom panel, and a pair of shoulder panels connected to resepective side edges of said side panels, said method comprising:

a. disposing said blank in a horizontal plane;

b. pushing said blank downwardly with an expanded expandable mandrel;

c. folding said side panels as said blank moves downwardly;



d. perpendicularly folding said end panels;

e. adhesively connecting said end panels and said side panels;

f. folding said shoulder panels to a position perpendicular to said side panels; and

g. contracting said expandable mandrel and withdrawing said mandrel from said tray.

4,052,934

DEVICE FOR ATTACHMENT TO A FRYING PAN, COOKING POT OR LIKE COOKING UTENSIL

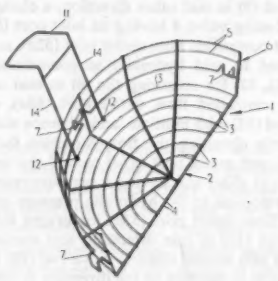
Sidney Shinman, 102 Sharps Lane, Ruislip, Middlesex, England

Filed Jan. 21, 1976, Ser. No. 650,903

Claims priority, application United Kingdom, Jan. 23, 1975, 3027/75

Int. Cl.² A47J *36/20*

U.S. Cl. 99—355 **6 Claims**



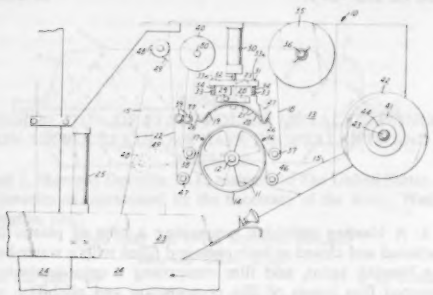
1. A device for attachment to a frying pan, cooking pot or like cooking utensil, the device comprising an open-work metal base member which is substantially flat and of circular segment shape, a flange upstanding from the curved radially outer limit of the base member, support means disposed adjacent the said outer limit for supporting the device on the rim of such a cooking utensile in an easily attachable and detachable manner, and a handle pivotally mounted on the device for movement in a plane perpendicular to the base member between a first stored position in which at least a portion of the handle lies on the base member and a second carrying position in which at least a portion of the handle rests against the flange.

4,052,935

PRINTING DEVICE

John R. Ward, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 12, 1975, Ser. No. 630,986
Int. Cl.² B44B *5/00*
U.S. Cl. 101—11 **3 Claims**



1. A device for printing a predetermined message at spaced intervals in the backing of a pressure sensitive adhesive tape by selectively heating portions of a dye-web bearing a heat volatizable or sublimable dye pressed against said backing and adapted for use with a tape applying apparatus which pulls a said tape from the device as the tape is applied, wherein said device comprises:

a frame;

a wheel rotatably mounted on said frame and having a cylindrical periphery adapted for contact by the adhesive surface of a said tape;

means adapted for guiding a said tape along a tape path including an arcuate segment of the cylindrical periphery of said wheel extending from a first position to a second position relative to said frame, said means guiding the tape so that the adhesive surface of the tape is guided into contact with said wheel adjacent said first position and is peeled out of engagement with said wheel adjacent said second position;

means adapted for guiding a said dye-web along a dye-web path with a length of the dye-web contacting the backing of the length of a said tape contacting said arcuate segment of the wheel;

a printing plate having a curved concave contact surface with a radius corresponding to the radius of said cylindrical periphery, said contact surface being defined by projecting portions of said printing plate providing said message;

means for heating the contact surface of said printing plate to a predetermined temperature required to volatize or sublime the dye in a said dye-web;

means mounting said printing plate on said frame for movement for a release position with said contact surface spaced from said arcuate segment of the wheel to afford movement of a said tape and a said dye-web along said paths and a printing position with said contact surface pressed against the length of the dye-web contacting the length of the tape along said arcuate segment of the wheel;

means adapted for intermittently rotating said wheel to intermittently advance a said tape along said path by adhesive contact between the tape and said wheel and to provide a dwell period between successive advancements;

means for moving said printing plate from its release position to its printing position and back to its release position during each of the dwell periods; and

means for advancing a said dye-web during each of the advancements of a said tape for a distance substantially less than said predetermined distance;

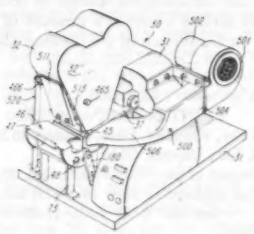
and wherein said means for guiding said tape further includes an arm supporting a guide member adapted to guide the length of a said tape between a said tape applying apparatus and said second position along said tape path, said arm being mounted on said frame for movement between an extended position for said arm with said guide member positioned to provide a path portion of an extended length between said second position along said tape path and the tape applying apparatus, and a retracted position for said arm with said guide member positioned to provide a path portion of a length substantially shorter than said extended length between said second position along said tape path and the tape applying apparatus, means for biasing the arm toward its extended position; means for deactivating said device when said arm is in its extended position, and means for retaining said printing plate in its release position and for continuously rotating said wheel to advance said tape along said tape path when said arm is in its retracted position while affording operation of said device to print said message at spaced intervals in the backing of said tape when said arm is between its extended and retracted positions.

4,052,936

PRINTING APPARATUS

Robert M. Pabodie, Dayton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 329,771, Feb. 5, 1973, Pat. No. 3,902,412, which is a continuation-in-part of Ser. No. 215,820, Jan. 6, 1972, Pat. No. 3,767,098. This application Jan. 17, 1975, Ser. No. 541,963
Int. Cl.² B41F *1/08*
U.S. Cl. 101—93.07 **12 Claims**



1. Printing apparatus for forming printed records from a web of record material, comprising: at least one printing member having a plurality of printing elements, means for advancing the printing member to bring the selected printing elements to a printing position in a printing zone while the other printing elements are in a non-printing position, means for inking the printing member, a severing zone having severing means in proximity to the printing zone and operable to sever a printed record from the web, a paper-dust shield adjacent and between both the printing and severing zones and in contact with at least one printing element in the non-printing position adjacent the severing zone during the severing operation to protect the printing member from accumulating paper dust created during the severing operation.

4,052,937

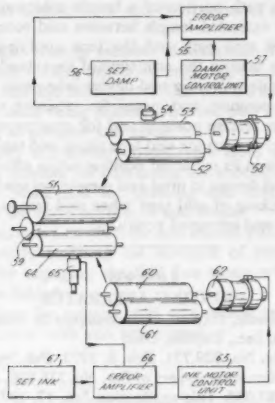
PRINTING PLATE WATER SENSING MEANS AND METHOD

Leslie Edward Lawson, Orpington; John Sleeman Rogers, and Peter Edward Watts, both of Reading, all of England, assignors to Vickers Limited, London, England

Continuation of Ser. No. 396,245, Sept. 11, 1973, abandoned. This application July 22, 1975, Ser. No. 597,989
Claims priority, application United Kingdom, Sept. 12, 1972, 42390/72
Int. Cl.² B41L *25/02*; B41M *1/06*; G01N *21/48*
U.S. Cl. 101—147 **8 Claims**

1. A method of determining the amount of water present on

the surface of a printing plate during lithographic printing, which method comprises directing radiation only onto another surface which is separated from the surface of the printing plate and which carries an amount of water related to the amount of water present on the surface of the printing plate, said other surface being grained to an extent to provide surface



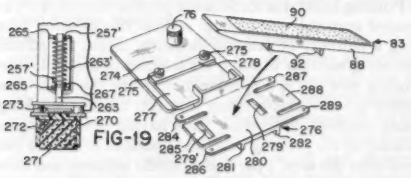
irregularities which will be incompletely filled by the amount of water desired on the printing plate, whereby variations in the amount of water present will vary the reflectivity of said other surface, and detecting the amount of radiation reflected from said other surface to obtain a measure of the amount of water present on the surface of the printing plate.

4,052,938

PRINTING APPARATUS

Raymond L. Kirby, Vandalia, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Continuation-in-part of Ser. No. 537,630, Dec. 30, 1974, Pat. No. 3,933,092. This application Dec. 18, 1975, Ser. No. 642,037
Int. Cl.² B41F *1/06, 1/40*
U.S. Cl. 101—291 **14 Claims**



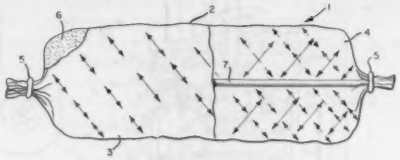
1. Printing apparatus including printing means having a print head and a platen, one of the print head and the platen being movable and the other being fixed, an ink cartridge having a cartridge body and an ink receptive pad carried by the cartridge body, a traveling inker including an ink pad alternately cooperable with the cartridge pad and the print head, and means removably mounting the cartridge body to the movable one of the print head and the platen for canting movement upon contact with the ink pad to provide uniform pressure contact between the ink pad and the cartridge pad, the improvement comprising a support for the cartridge body, post means secured to the support, guide means for guiding the post means for movement, means providing a loose fit between the guide means and the post means to enable the cartridge to cant relative to the ink pad, and spring means for urging the cartridge toward the ink pad but enabling the cartridge and the support to yield when acted upon by the ink pad.

4,052,939

TAMPABLE CHUB CARTRIDGE

Walter John Simmons, Martinsburg, and Frank Marsden Willis, Hedgesville, both of W. Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 1, 1976, Ser. No. 672,726
Int. Cl.² F42B *3/00*
U.S. Cl. 102—24 R **13 Claims**



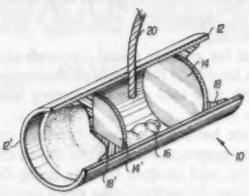
1. A blasting cartridge comprising a tube of plastic film gathered and closed at both ends and filled with a water-bearing blasting agent, said film comprising a cross-laminate of oriented film layers of like composition and pliability, said layers being adapted to fail in different directions along at least one unlaminated zone so as to rupture said cartridge upon the application of end pressure thereto in a borehole with a tamping rod, said unlaminated zone(s) being formed in said cross-laminate prior to or in conjunction with the application of end pressure to said cartridge.

4,052,940

METHOD AND ARTICLE OF MANUFACTURE OF A PYROTECHNIC DEVICE

Gerald B. Gits, Riverside, and Daniel L. Deverich, Lyons, both of Ill., assignors to Apollo of the Ozarks, Inc., Stanton, Mo.

Filed Oct. 16, 1975, Ser. No. 622,803
Int. Cl.² C06D *1/06, 1/08*
U.S. Cl. 102—33 **1 Claim**



1. A pyrotechnic device having maximal audible effect upon detonation comprising:

a frangible tubular casing, 1–1¾ inches in length by ¼ to ½ inches inside diameter;

an explosive charge within said casing, said charge being no greater than 2 grains;

a disc within said casing between said charge one open end with said disc and sealant closing off said one open end of said casing and at least a sealant closing off the other end of said casing, said sealants being axially spaced from each other to define a hollow cavity containing said explosive charge whose volume is substantially larger than the volume occupied by the mass of explosive charge with said cavity extending approximately one-third the length of said casing;

said casing being of 0.015 to 0.040 inches in thickness and said disc having a thickness of from 0.010 to 0.125 inches;

a fuse secured within said casing in communication with the explosive; and

wherein each of said sealants is in contact with said casing on opposite sides of said explosive charge and constituting a longitudinally extending solid fillet with the periphery of

the fillet contacting the interior of the frangible tubular casing over 15% to 20% of the longitudinal interior depth of the casing; wherein the resistance of the casing and the resistance of the sealants is such as to provided a balanced inertial resistance to insure bursting of the casing upon detonation of the explosive charge.

4,052,941

PRODUCTION OF ELECTROLESS METAL COATINGS ON NITROCELLULOSE BASE PROPELLANTS AND ARTICLE

Scott I. Morrow, Denville, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 24, 1976, Ser. No. 689,288
Int. Cl.[2] C23C *3/02*
U.S. Cl. 102—39 12 Claims

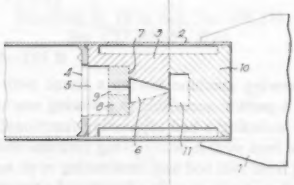
1. In a method for producing a metal coating on a nitrocellulose base propellant substrate, wherein the metal is deposited on the nitrocellulose substrate from an electroless metal plating bath, the improvement which comprises incorporating in the nitrocellulose substrate to be coated an effective amount of a particulate ammonium perchlorate to increase the adhesion of the metal coating produced.

4,052,942

GRENADES PROVIDED TO BE LAUNCHED BY A BULLET

Jean A. Pelousse, Brussels, Belgium, assignor to "s.a.PRB", Société Anonyme, Brussels, Belgium

Filed May 24, 1976, Ser. No. 689,683
Claims priority, application Belgium, May 29, 1975, 254367
Int. Cl.[2] F42B *11/42*
U.S. Cl. 102—65.2 1 Claim



1. In a grenade adapted to be launched by a bullet, of the type having at least one bullet capturing part which is distorted by the stress of the driving bullet when the grenade is launched, the improvement comprising

a support element secured to said grenade;

a bore in said support element and having a shoulder against which said bullet capturing part is seated;

a conical hole in said support element, extending from said shoulder and tapering away from said bore, said bullet capturing part having an opening therethrough, of less diameter than the base of said conical bore adjacent said shoulder, said opening communicating directly with said conical bore; and

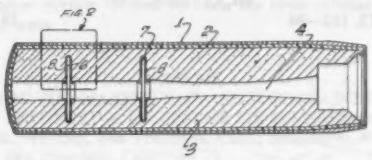
the small diameter end of said conical bore, remote from said shoulder, communicating with a blind chamber, of greater diameter than said small diameter end.

4,052,943

COATING COMPOSITION AND METHOD FOR IMPROVING PROPELLANT TEAR STRENGTH

Donald E. Elrick, Rawlings, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 16, 1976, Ser. No. 723,696
Int. Cl.[2] F42B *5/16*
U.S. Cl. 102—103 11 Claims



1. A method of increasing the tear strength of the propellant of a rocket motor in which the propellant is a molded structure formed with an axial gas-conducting port, said method including the steps of:

dissolving in a volatile solvent stoichiometric quantities of a polyglycol adipate and an isocyanate with said quantities being adjusted to provide a ratio of 1–2 isocyanate groups to one hydroxyl group,

applying said solution as a coating on selected areas of said port surfaces,

evaporating said solvent, and

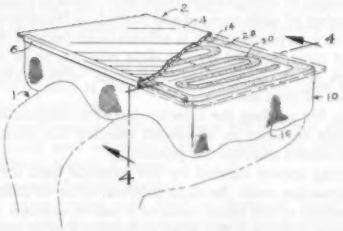
aging said coating sufficiently to achieve an essentially complete reaction between said hydroxyl and isocyanate groups for forming on said selected surface areas a tear-inhibiting polymeric gel, said polyglycol adipate having a relatively high functionality for assuring a cross-linked protective coating.

4,052,944

PORTABLE SHUFFLE DESK

Russell A. Jennings, 1513 Tilden, Wichita Falls, Tex. 76309

Filed Nov. 20, 1975, Ser. No. 633,945
Int. Cl.[2] A47B *23/00*
U.S. Cl. 108—43 11 Claims



1. A lightweight portable desk adapted to be placed on and conform to regular and irregular base surfaces, comprising planar hard desk surface means, flexible casing means attached to the bottom periphery of said desk surface means, said flexible casing means attached to the periphery of partially rigid sheet means which is substantially coplanar with said desk surface means and secured to the bottom thereof, said casing means being substantially filled with a lightweight flowable granular material, said granular material having a suitable density and looseness whereby said desk can be placed on any base surface and said desk surface can be adjusted to a desired angular position by readily shifting said lightweight flowable material within said flexible casing to thereby conform said

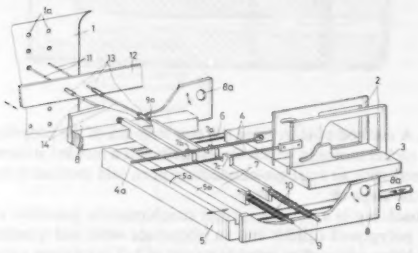
casing and flowable material to the contour and shape of said base surface.

4,052,945

PATTERN CONTROL MECHANISM FOR EMBROIDERING MACHINE

Wolfgang Teetz, Kerken, Germany, assignor to Maschinenfabrik Carl Zangs Aktiengesellschaft, Krefeld, Germany

Filed Sept. 16, 1976, Ser. No. 724,104
Claims priority, application Germany, Sept. 17, 1975, 2541418
Int. Cl.[2] D05C *5/00*
U.S. Cl. 112—86 **14 Claims**



1. A mechanism for selectively driving pairs of cam slides of a pattern generating apparatus of the type which is used in automatic embroidering machines, for example, where cyclical movements of any of a large number of different magnitudes are generated by a gear-type analog computer whose input is mechanically derived from an advancing stroke, or from the absence of an advancing stroke, of a row of cooperating longitudinally guided cam slide pairs, as each cam slide pair produces a positive, or a negative, or zero unitary motion input, in accordance with pattern information which is fed to the device by a punched tape, the cam slide driving mechanism comprising in combination:

an elongated slide mover pivotably attached to one end of each cam slide and extending in general alignment with the direction of cam slide movement, each slide mover being pivotable over a small angle, between a selected position for driving engagement and a non-selected position in which it is to remain non-driven; the slide movers of a pair of cam slides forming a slide mover pair;

a plurality of elongated selector bars, equal in number to the number of slide movers and extending transversely to the latter in a plane which is substantially parallel to the general plane defined by the slide movers; pairs of selector bars being operatively associated with corresponding pairs of slide movers;

means for guiding the selector bars for longitudinal movements between an advanced selector bar position and a retraceted selector bar position;

selecting means carried by the selector bars for selection interaction with the slide movers, so as to determine the position of the latter, each of a pair of selector bars interacting with each one of an associated pair of slide movers, so that, when one of the two selector bars is in its advanced position and the other is in its retracted position, one of the two associated slide movers will be selected and the other will not be selected, while in all other selector bar positions neither slide mover will be selected, thereby precluding the simultaneous selection of both slide movers of a slide mover pair;

a slide mover drive bar extending transversely to the slide movers, including means for guiding and driving said drive bars in a synchronized reciprocating motion along a path of which at least a major motion component corresponds to the direction of cam slide movement, and of which the reversal point from a return stroke to a drive stroke is so related to the slide mover positions that the drive bar, in its drive stroke, engages and advances those slide movers which are in said selected position, while missing those slide movers which are in the non-selected position;

a punched tape, including a likewise synchronized, intermittently operating punched tape indexing drive, the punched tape having a hole track for each selector bar; and

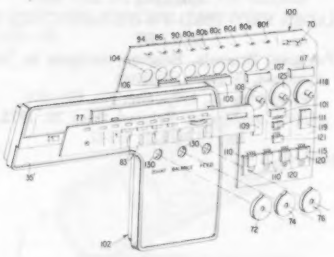
punched tape sensing means, including a feeler needle connected to each selector bar and biased towards the punched tape, in alignment with a hole track thereof, so as to move the selector bar to its advanced position in the presence of a hole in said hole track, while holding it in its retracted position in the absence of a hole in said track; said punched tape sensing means including a feeler needle drive bar executing a likewise synchronized reciprocating motion in which it withdraws all the needled from the punched tape, while the latter is advanced by its indexing drive.

4,052,946

ELECTRONIC CONTROL PACKAGE FOR SEWING MACHINE

John Stephen Rydz, Scotch Plains, and John Whilldin Wurst, Dover, both of N.J., assignors to The Singer Company, New York, N.Y.

Filed Mar. 26, 1976, Ser. No. 670,778
Int. Cl.[2] D05B *3/02*
U.S. Cl. 112—158 E **8 Claims**



1. In a sewing machine having a frame with at least one opening in a portion accessible to a sewing machine operator, said frame including a bed supporting functional components including a feed system and sewing instrumentalities, a standard rising from said bed and terminating in an arm overhanging said bed; said arm carrying functional components including a needle carrying needle bar for endwise reciprocation in cooperative arrangement with said sewing instrumentalities in said bed; said frame supporting functional components including at least a drive system for reciprocating said needle bar and driving said feed system, and regulating means for said feed system; wherein the improvement comprises;

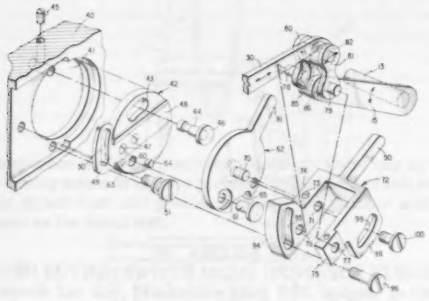
an electronic control unit, one of a plurality of possible electronic control units, each having electronic means including control components and electronic circuitry selectively effective to influence said functional components and panel means providing operator access to said electronic means for selective control of said functional components; means interchangeably supporting said electronic control unit with said panel means in said at least one opening in said frame; and means interconnecting said electronic control unit and said functional components.

4,052,947

ZIGZAG CONTROL DEVICE FOR SEWING MACHINES

Reinhold Papajewski, Buchig, and Helmer Heinz Holl, Karlsruhe, both of Germany, assignors to The Singer Company, New York, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,826
Int. Cl.[2] D05B *3/02*
U.S. Cl. 112—158 R 4 Claims



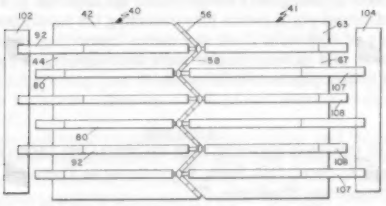
1. A zigzag control mechanism for a sewing machine having a needle bar supported for lateral zigzag movement, said zigzag control mechanism comprising a bight adjusting member (72) for controlling the width of zigzag stitching, a position adjusting member (62) for controlling neutral position within the range of zigzag movement at which straight stitches will be formed when the width of zigzag stitching is reduced to zero by the bight adjusting member, and a width limiting member (42) for limiting the width of zigzag stitching which may be set by said bight adjusting member (72) and for simultaneously effecting that adjustment of the position adjusting member (62) which will locate the neutral position of needle vibration at the extreme left and right hand edges of zigzag sewing regardless of the total width of zigzagging.

4,052,948

METHOD AND APPARATUS FOR MAKING RECTANGULAR CORRUGATED EXPANSION JOINTS

George Thomas Straza, and Edward Leon Parr, both of El Cajon, Calif., assignors to Straza Enterprises, Ltd., El Cajon, Calif.

Filed Feb. 9, 1976, Ser. No. 656,130
Int. Cl.[2] B21D *13/10*
U.S. Cl. 113—116 B 8 Claims



1. The method of making a corrugated corner piece comprising the steps of,

laying out a pair of substantially identical hinge plate members, each hinge plate member comprising a plurality of plate members joined on adjacent sides by substantially parallel tubular hinge elements, and having at a location across the width and intermediate the ends thereof, cross tubular hinge elements in a zig-zag pattern at intersecting angles, dividing the plate members into pairs of hingedly interconnected die members,

placing a metal sheet blank between said hinge plate members, with the hinge plate members being aligned with each other,

placing clevises over the hinge portions of each of the adjacent pairs of hinge elements, holding said hinges together with said metal blank sandwiched therebetween.

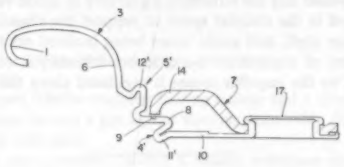
and holding stationary every other clevis on one of said die members, while simultaneously moving the alternate clevises on the other die member to pivot said hinge plate members about said zig-zag cross tubular hinge elements, causing the plate members to fold in corrugated configuration with the blank therebetween and with a corrugated corner portion formed between the cross tubular hinge elements.

4,052,949

METHOD FOR MAKING EASY OPEN CONTAINER END WITH PROTECTIVE EDGES FOR ITS SEVERED SCORE

Keith R. Woodley, San Francisco, Calif., assignor to Wescan, Inc., San Francisco, Calif.

Division of Ser. No. 698,093, June 21, 1976, Pat. No. 4,017,000.
This application Dec. 30, 1976, Ser. No. 755,746
Int. Cl.[2] B21D *51/44*
U.S. Cl. 113—121 C 2 Claims



1. A method of making an easy opening container end and comprising steps of

providing a piece of sheet material including an annular radial section joined by an annular first connecting section to an axially displaced center section, and a generally curved section joined to said annular radial section by a second annular connecting section;

providing an annular inwardly opening locking bend in said second connecting section;

providing an annular outwardly opening bead in said second connecting section spaced from said locking bend toward said center section;

converting said first connecting section into a generally axial wall and an expansion rib which circumscribes said center section;

forming a score line of weaknesses in said radial section to define a panel at least partially removable from the piece of sheet material;

axially compressing said expansion rib to force the end of said axial wall adjacent said expansion rib radially outwardly to form a Z-bend;

clamping said locking bend;

axially compressing said bead to form an outer double-reverse fold having the compressed bead overlying said score line;

clamping said center section;

axially compressing said Z-bend to form an inner double-reverse fold having the compressed lower bend of said Z-bend underlying said score line.

4,052,950

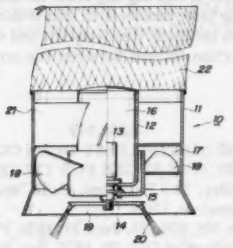
CLEANING DEVICE

Kiichi Hirata, 3-50, Hemi, Yokosuka, Kanagawa, Japan

Filed May 3, 1976, Ser. No. 682,707
Claims priority, application Japan, May 6, 1975, 50-53228
Int. Cl.[2] B60S *3/02*
U.S. Cl. 114—222 11 Claims

1. A device for cleaning materials attached to a vessel and a

building structure below water level comprising a generally cylindrical outer shell and a central chamber arranged concentrically within the outer shell, said chamber having an impeller means for discharging the attached materials together with water through a circular space between the outer wall of the chamber and the inner wall of the shell, said device itself being absorbed and adhered onto a cleaning surface of the vessel and



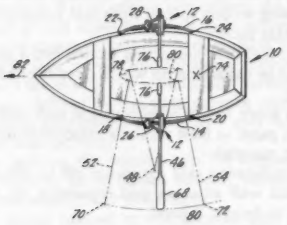
the building structure during operation of said impeller means, and a cleaning means for removing the materials on the surface of the vessel and the structure, a plurality of guide vanes being arranged in the circular space to support the chamber within the outer shell, said guide vanes being inclined relative to the direction of the axis of the chamber whereby a vortex flow caused by the impeller means is regulated along the axis.

4,052,951

ROWING DEVICE FOR A FORWARD FACING ROWER

Alton E. Farr, 14050 B Marquesas Way, Marina del Rey, Calif. 90291

Filed Jan. 9, 1976, Ser. No. 647,916
Int. Cl.[2] B63H *16/10*
U.S. Cl. 115—24.1 **11 Claims**



1. A rowing device which enables the rower to pull the handle of a substantially straight and continuous oar backward while facing the direction of motion of the boat comprising:

a rail connected to the boat; and

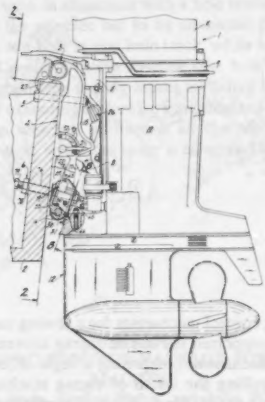
a carriage including means for connecting said carriage said rail for predetermined movement about and along said rail, said last named means including at least three rollers which ride on said rail to restrain said carriage to longitudinal movements along said rail and rotational movements about said rail and restraint means on said carriage for engagement with a substantially straight and continuous oar and including at least two oarlocks connected to said carriage and positioned so that the oar is restrained so as to remain generally perpendicular to said rail during normal operation of said device.

4,052,952

HYDRAULIC POWERED TRIM AND TILE APPARATUS FOR MARINE PROPULSION DEVICES

David Jerry Hale, Pickett; William B. Mayer, and Delhardt K. Kollman, both of Oshkosh, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Sept. 4, 1975, Ser. No. 610,318
Int. Cl.[2] B63H *5/12*
U.S. Cl. 115—41 HT **31 Claims**



1. An outboard motor apparatus comprising a clamp bracket means, an outboard motor pivotally attached to the upper end of said bracket means and having a drive shaft housing extending in the rearof said bracket means, and a plurality of combined power trim actuating and shock absorbing piston-cylinder units mounted to the front of and in alignment with said housing between the bracket means and housing, each of said piston-cylinder units having a cylinder member and a piston member mounted in said cylinder member with a piston rod member extending outward, one member pivotally attached to said motor, the opposite member pivotally attached to the bracket means, each of said piston-cylinder units having shock absorbing means, and a hydraulic supply connection means connected to said shock absorbing piston-cylinder units to selectively position and hold the outboard motor in any one of a plurality of angular positions relative to said bracket means for trim positioning of the outboard motor during propulsion, said hydraulic supply connection means including a manifold coupled to and moving with said piston-cylinder units, said manifold having a plurality of supply ports connected by interconnecting passageway means within the manifold to a plurality of output ports, means for connecting the supply ports to a supply of hydraulic fluid, and means connecting said output ports to said piston-cylinder units for supplying a hydraulic fluid to said piston-cylinder units.

4,052,953

FLUSHING DEVICE FOR OUTBOARD MOTORS

Raman A. Patel, Oak Park, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Apr. 19, 1976, Ser. No. 678,027
Int. Cl.[2] B08B *3/02, 9/00*
U.S. Cl. 134—167 R **16 Claims**

15. A flushing device for supplying fluid to a water intake port on a lower unit of a marine propulsion device, said flushing device comprising a flexible strap, fastening means connected to said strap for securing said strap around the lower unit, a member connected to said strap and adapted for sealing engagement with the lower unit and for covering the water intake port, said member including a conduit adapted for communication with the water intake port and with a source of fluid, locating means connected to said strap for engagement

with the lower unit in a position to locate said member with respect to the lower unit so that said member covers the water intake port, and means for releasably taking up slack in said

strap when said strap is secured around the lower unit by said fastening means to thereby prevent displacement of said locating means from said position locating said member with respect to the lower unit.

4,052,954

PUSH BUTTON SWITCH MODE INDICATOR ELEMENT

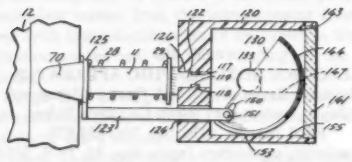
Kenneth Lee Roy, Menomonee Falls, Wis., assignor to Globe-Union Inc., Milwaukee, Wis.

Filed May 13, 1974, Ser. No. 469,228

Disclosure was also published under second Trial Voluntary Potest Program on Feb. 17, 1976

Int. Cl.² G09F 9/00; H01H 9/16

U.S. Cl. 116—124 L **2 Claims**



1. A mode indicating device for a pushbutton switch, said switch having a body and a reciprocating slider moveable between a first position in which said switch is in one mode and a second position in which said switch is in a second mode, said indicating device comprising:

a lens having a leg portion extending therefrom;

a hollow housing attached to said slider, said housing having an opening receiving said lens in one end, an aperture at the opposite end, a bearing compartment disposed on a wall of said hollow housing, and a slot extending from said bearing compartment to said one end of said housing [and receiving said lens leg portion], said lens leg portion forming a wall of said bearing compartment;

a mode indicator rotatably mounted within said housing adjacent the interior of said lens, said indicator being rotatable about an element having an axis which is fixed relative to said housing, said element extending transverse to the direction of movement of said slider between opposed walls of said housing and having a shaft portion thereof disposed in said slot in said bearing compartment and adjacent said lens leg portion, said mode indicator having a rounded surface formed about said fixed axis and having mode indicating indicia formed thereon; and

actuator means having one end coupled to said switch body and the other end extending through said aperture and means pivotally coupled to said mode indicator for pivoting said indicator in response to movement of said slider and housing to position said indicia adjacent said lens when said switch is in said second mode.

4,052,955

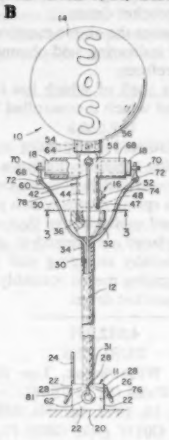
EMERGENCY BALLOON DEVICE

Nathan Haushalter, Box 7772, Longview, Tex. 75601

Filed Sept. 8, 1976, Ser. No. 721,352

Int. Cl.² G08B 5/00; G09F 9/00

U.S. Cl. 116—124 B **6 Claims**



1. An emergency balloon device comprising:

a balloon,

a T-shaped tubular member having a stem and a cross-bar,

a cartridge having a gas lighter than air removably disposed within said stem,

at least one cannister having a smoke substance disposed therein removably received within said cross bar for selective emission of said smoke

means on said T-shaped tubular member for joining said cartridge and said balloon so that gas in said cartridge can selectively inflate said balloon,

a flexible cable joined at one end by a sleeve member to said T-shaped tubular member,

a weighted base joined to the other end of said flexible cable, and

valve release means between said cartridge and balloon for selective deflating said balloon after said balloon has been inflated.

4,052,956

CHANNEL INDICATOR

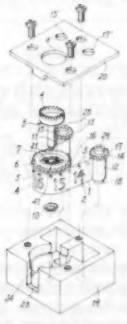
Hitoshi Kurohata; Jun Kawai, and Nobuyoshi Hizuka, all of Aichi, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed June 2, 1976, Ser. No. 692,048

Claims priority, application Japan, June 11, 1975, 50-71116

Int. Cl.² H03J 1/08

U.S. Cl. 116—124.1 A **3 Claims**



1. A channel indicator comprising:

a thin film tape having channel numbers printed thereon;

a sprocket drum for advancing said thin film tape by its rotation;

a pair of reels to which both ends of said thin film tape are fixed, respectively;

a linking means for rotating said reels in response to the rotation of said sprocket drum;

a housing which encases the above-mentioned elements and has a window for indicating said channel number on the thin film tape therefrom;

a channel selector, a shaft of which has tuning means, the tuning frequency of which is controlled by revolving said shaft;

a gear means linked to said shaft; and

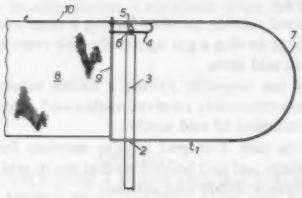
an adjustable engaging means including a pair of engaging members both having radial notches on engaging faces, respectively, and a spring means which pushes said engaging members toward each other so that said radial notches on said engaging faces are pressed to each other with a specified force thereby engaging said pair of engaging members, said engaging means rotatably linking said gear means and said sprocket drum.

4,052,957

BURGEES

George Herbert Lee, Willowbrook, Lon Hawen, Abersoch, Pwllheli, Gwynedd, Wales (LL53 7EW)

Filed Dec. 11, 1975, Ser. No. 639,731
Int. Cl.[2] G01W *1/00*; G09F *17/00*
U.S. Cl. 116—174 5 Claims



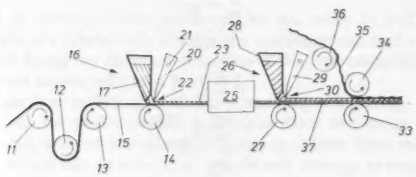
1. A burgee comprising a flag, frame means on which the flag is carried, a staff on which the frame means is supported for rotational movement about the axis of the staff, and pivot bearing means effective between said frame means and the upper end of the staff, said frame means comprising a length of wire extending to one side of the staff for securement of the flag thereto and extending on the opposite side of the staff to provide a balance weight, the length of said frame means being variable so as to vary the balance of said burgee.

4,052,958

APPARATUS FOR CONTROLLING THE SIZE OF A GAP

Elsworth Richard Delves, Lower Hackworth Village, England, assignor to Purpose Engineers Limited, Little Eaton, England

Filed Dec. 29, 1975, Ser. No. 645,286
Int. Cl.[2] B05C *11/04*
U.S. Cl. 118—119 8 Claims



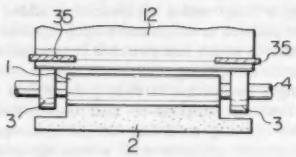
1. In an apparatus for forming a continuous layer of material on a major surface of a web, a conbination comprising a laying head for discharging the material; means for continuously advancing the web past said laying head so that the material discharged by the latter deposits on one major surface of the web; means for forming the deposited material into a layer on the one major surface of the web, including a support and a forming member mounted on said support for movement toward and away from the one major surface of the web in juxtaposition therewith to bound an extrusion gap with the same; and means for moving said forming member relative to the web to thereby control the size of said extrusion gap and thus the thickness of the layer being formed, including an elongated cylinder-and-piston unit having a housing mounted on said support and a plurality of cylinder-and-piston sub-units accommodated in said housing longitudinally adjacent one another, a terminal one of said sub-units having a projection extending longitudinally outwardly of said housing, said moving means further including means for admitting pressurized medium into said housing to act on said sub-units to extend and retract the same, switching valve means in said admitting means for individually controlling the admission of the pressurized medium to said sub-units to individually extend and retract the same and thus incrementally extend and retract said projection, and a wedge member on said projection having a ramp in contact with said forming member, said ramp converting the incremental extension and retraction of said projection into a proportionally reduced incremental movement of said forming member.

4,052,959

ELECTROPHOTOGRAPHIC APPARATUS

Toshio Hayashi; Kazuo Goto, and Osamu Haruyama, all of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Jan. 30, 1976, Ser. No. 653,875
Claims priority, application Japan, Jan. 31, 1975, 5013567
Int. Cl.[2] G03G *15/10*
U.S. Cl. 118—644 8 Claims



1. In electrophotographic apparatus having a movable photoconductive member:

a roller disposed adjacent to the photoconductive member and a rotatable in a direction so that a peripheral portion of the roller nearest to the photoconductive member moves in a direction opposite to a peripheral portion of the photoconductive member nearest to the roller;

a shaft on which the roller is fixed for unitary rotation;

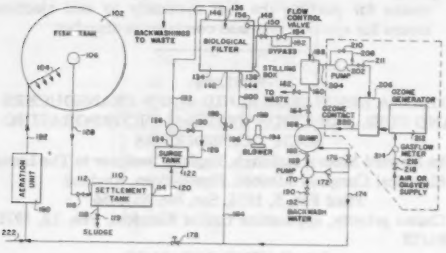
two bearings supporting opposite ends of the shaft respectively, a diameter of the bearings being greater than a diameter of the roller by a predetermined value, each of the two bearings comprising: an inner race fixed to the shaft; an outer race in rolling contact with the photoconductive member; rolling elements operatively disposed between the inner and outer races; and seal means to enclose the rolling element; and

a wiper engaging the photoconductive member upstream of each of the two bearings respectively.

4,052,960
FISH REARING SYSTEM

Alexander E. Birkbeck, Delta, and Cecil Craig Walden, Vancouver, both of Canada, assignors to Province of British Columbia, Canada

Filed Oct. 7, 1975, Ser. No. 620,398
Claims priority, application Canada, Oct. 2, 1975, 236,875
Int. Cl.² A01K *63/00*
U.S. Cl. 119—3 **9 Claims**



1. A fish rearing system in which water can be recycled, the system comprising the following components in combination:

a. a fish tank containing fish and having a recycle water inlet and an outlet;

b. primary filtration means having an inlet communicating with the outlet of the fish tank, a sludge outlet and a second outlet for recycling water, the primary filtration means being able to remove a substantial proportion of particulate matter from the water coming from the fish tank with low retention time of the water in the primary filtration means and without blinding of the filtration means;

c. a surge tank having an inlet communicating with the second outlet of the primary filtration means, a first outlet for waste and a second outlet;

d. a pump communicating with the second outlet of the surge tank and having an outlet;

e. a biological filter for oxidizing toxic ammonia nitrogen into the non-toxic nitrate form, said filter communicating with the outlet of the pump, the filter comprising a container having a false floor an inlet for recycled water above the false floor and an outlet for backwashings above the false floor, an outlet for recycled water, an inlet for backwash air and an inlet for backwash water below the false floor;

f. a particulate filter medium having particles of a size in the range 0.5 to 10 mm. positioned on the false floor;

g. water backwash means whereby backwash water can be forced through the inlet for backwash water in the biological filter and through the particulate medium of the filter to clean the medium when required;

h. air scour means whereby air can be forced through the inlet for backwash air in the biological filter and through the particulate medium of the filter to lift and expand the medium and agitate the medium vigorously to permit adequate backwashing of the medium by the backwash water;

i. a stilling box communicating with the outlet for recycled water of the biological filter, the stilling box having an outlet;

j. a sump communicating with the outlet of the stilling box and having an outlet;

k. a recycle pump communicating with the outlet of the sump;

l. an ozone contact unit in which a predetermined amount of recycling water is contacted with ozone in an amount sufficient to lower the total nitrite content of the water to a level acceptable to fish but which amount does not leave free ozone in the water re-entering the rearing tank;

m. an aeration unit positioned between the filter outlet for recycled water and the recycled water inlet of the fish tank whereby water in the system can be aerated and stripped of carbon dioxide;

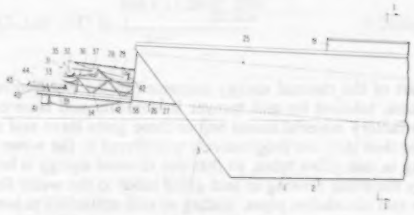
n. a fresh water inlet in the system; and

o. conduit means whereby water can be fed throughout the system.

4,052,961
APPARATUS FOR PLANTING SEED OYSTERS

Frederick L. Garrett, Jr.; Frederick L. Garrett, III, and Gordon M. Birkett, all of Garrett's Marina, Bowler's Wharf, Va. 22560

Filed June 14, 1976, Ser. No. 695,448
Int. Cl.² A01K *61/00*; 119 *2-4*
U.S. Cl. 119—4 **6 Claims**



1. In an apparatus for uniformly distributing seed oysters over a previously prepared oyster seed bed, comprising:

a vessel having a bow and stern of conventional design, and a V-shaped hold; adapted to contain seed oysters

a substantially U-shaped structure having sides and a bottom defining a channel in the lower portion of the hold, running substantially the length of the vessel, the sides and bottom of the U-shaped structure extending through and a short distance beyond the bow;

an endless conveyor mounted in said channel;

a centrifugal spinner disk mounted on a bracket projecting from the bow of the vessel, located below the discharge end of the conveyor, the upper surfaces of the conveyor and the spinner disk being coated with a soft reselient material to prevent injury to the seed oysters;

a series of short plates resting on the lower surfaces of the V-shaped hold, above the conveyor, said plates being readily removable to expose progressively portions of the conveyor as the load of seed oysters is distributed;

power means for operating the conveyor and the spinner disk, and

an inboard-outboard motor mounted at the stern of the vessel to enable the same to the readily maneuvered over the oyster bed during the seeding operation.

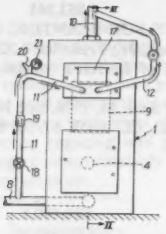
4,052,962
ECONOMIZER DEVICE FOR EXPLOITING THE THERMAL OUTPUT OF HEATING INSTALLATIONS

Roger Dauthuille, 24 rue Romain Rooland, 93410 Vaujours, France

Filed Dec. 30, 1975, Ser. No. 645,468
Int. Cl.² F22B *7/00, 33/02*
U.S. Cl. 122—20 A **1 Claim**

1. An economizer device for fully exploiting the thermal output of central heating installations, the latter incorporating a boiler having water-circulation pipes between a cold-water feeding point and hot-water utilization points, employing both heating radiators and hot-water feeding devices of the type including: an adjustable heat source working intermittently and consisting of a sprayer for fuel oil, releasing hot combustion gases; a chamber disposed in proximity to said heat source

for collecting said gases, said chamber being fitted with pipes within which latter water circulates and flows towards the utilization points; the economizer device being formed of a long nest of continuously connected gilled tubes disposed in said chamber for bypassing said water-circulation pipes; circulation water inlet and outlet pipes each respectively connected to associated inlet and outlet tubes of said gilled tubes for directing water into and out of said economizer; refractory material means encapsultating said tubes and filling the whole available volume of said chamber, in such a way that the most



part of the thermal energy contained in the hot combustion gases, released by said sprayer is stored in said mass of said refractory material means before those gases leave said chamber then they are progressively transferred to the water flowing in said gilled tubes, so that this thermal energy is brought by the water flowing in said gilled tubes to the water flowing in said circulation pipes, leading to said utilization points, as a function of the consumption at these points, while said sprayer works with various outputs, after said sprayer has come to a total stoppage.

4,052,963

INTERNAL COMBUSTION ENGINE FOR COMBUSTION OF POWDERED SOLID FUEL

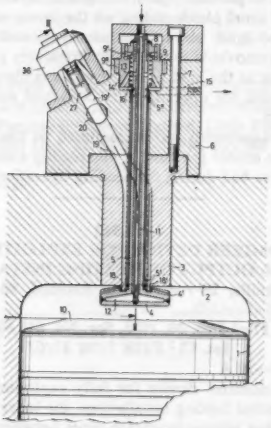
Anton Steiger, Illnau, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Aug. 30, 1976, Ser. No. 718,515

Claims priority, application Switzerland, Mar. 5, 1976, 2751/76

Int. Cl.² F02B *45/02;* F02D *19/04*

U.S. Cl. 123—23 **17 Claims**



1. In an internal combustion engine having at least one cylinder defining a combustion chamber and having a reciprocating piston slidably mounted therein, the combination comprising

means for feeding a powdered solid fuel to said cylinder, said means including a pressurized storage chamber for the fuel and a first duct connected to said storage chamber;

a control slider disposed at an end of said first duct spaced from said storage chamber for opening and closing said first duct;

a second duct disposed in selective communication with said first duct to receive fuel therefrom and extending to said combustion chamber;

a rotatable ejection means disposed in said combustion chamber at an end of said second duct; and

a plunger in said second duct at an end opposite said ejection means for pushing the fuel cyclically to said ejection means for ejection into said combustion chamber.

4,052,964

CORONA DISCHARGE FLUID FLOW TRANSDUCERS AND FUEL INJECTION SYSTEMS INCORPORATING SUCH TRANSDUCERS

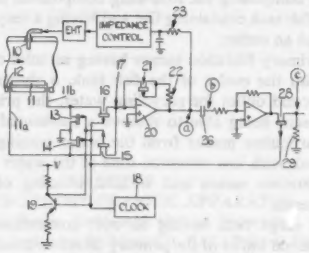
John Howard Moore, Redditch, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed Feb. 5, 1976, Ser. No. 655,656

Claims priority, application United Kingdom, Feb. 12, 1975, 5884/75

Int. Cl.² F02B *3/00, 33/00*

U.S. Cl. 123—32 EJ **7 Claims**



1. A corona discharge type fluid flow transducer comprising first and second electrodes between which the fluid flow to be measured is passed and between which a corona discharge current through the fluid is maintained, in use, the second electrode having two terminals and the difference between the current drawn from said terminals being representative of the fluid flow between the electrodes, in combination with a current difference measurement circuit including a current-to-voltage converter, cyclically operable switch means for alternatively connecting the two terminals of the second electrode to the current-to-voltage converter, and further switch means a.c. coupled to the current-to-voltage converter and operable in synchronism with said switch means to produce an output signal having a d.c. component related to the magnitude and sign of the difference between the voltage at the input of the current-to-voltage converter when the one terminal of the second electrode is connected to the input of the current-to-voltage converter and the voltage when the other terminal is so connected.

4,052,965

ENGINE COOLING SYSTEM VENT MEANS

Charles S. Morris, Pekin, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

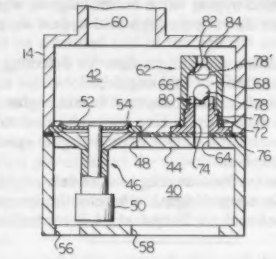
Filed Oct. 28, 1975, Ser. No. 626,420

Int. Cl.² F16K *31/18;* F01P *7/02*

U.S. Cl. 123—41.05 **6 Claims**

1. In an engine cooling system, a thermostat housing having first and second chambers, a coolant inlet in said second chamber, a coolant outlet in said first chamber, a first aperture intermediate said chambers, a thermostat means in said housing intermediate said chambers for controlling coolant flow from

said inlet to said outlet through said first aperture, a second aperture in said housing intermediate said chambers, the improvement which comprises fluid flow responsive vent valve means in said housing for closing off said second aperture when the coolant level rises in said housing as when coolant is flowing in said system while allowing air to escape through said second aperture as during filling of the coolant system, wherein said vent valve means comprises a valve housing defining a chamber therein, a valve inlet and a valve outlet in



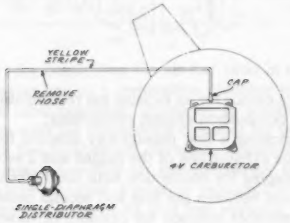
said valve housing, a valve seat adjacent said valve outlet, and a means for closing said valve outlet, said means for closing said outlet comprising a spherical ball float adapted to float in the coolant and seal against said valve seat, said valve housing further comprising a generally cylindrical adapter having a bore therethrough of smaller diameter than the diameter of said spherical ball float, and groove means on one end of said adapter for permitting air to escape from said first chamber through said bore and said groove means to said second chamber.

4,052,966

PROCESS FOR THE CONTROL OF OXIDES OF NITROGEN FROM INTERNAL COMBUSTION ENGINES

Jack L. Gockel, Montebello, Calif., assignor to Air Quality Products, Inc., Orange, Calif.

Filed Mar. 15, 1973, Ser. No. 341,503
Int. Cl.² F02P 5/04
U.S. Cl. 123—117 A **4 Claims**



1. An improved method for reducing NO_x emissions on American manufactured automobiles made before 1970 and which include a system for vacuum advance of ignition, and a single diaphragm distributor, directly connected by a vacuum hose to a carburetor vacuum source outlet without any intermediate deceleration switch, comprising:

permanently disconnecting the vacuum hose between the carburetor and the distributor;

permanently capping off the vacuum source outlet at the carburetor;

determining the automobile manufacturer's recommended timing setting; and

adjusting the timing of the engine when operating at the speed recommended by the manufacturer according to the following procedure:

if the manufacturer's recommended timing setting is more retarded than about one degree before top dead center, set the timing at about the manufacturer's recommended setting;

if the manufacturer's recommended timing setting is one degree before top dead center, to about 7.5° before top dead center, set the timing at about 1° before top dead center; and

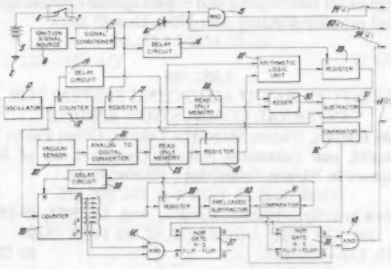
if the manufacturer's recommended timing setting is more advanced than about 7.5° before top dead center, set the timing at about one-half of the advance recommended by the manufacturer.

4,052,967

DIGITAL ELECTRONIC IGNITION SPARK TIMING SYSTEM

Ronald L. Colling, Millington; Myron U. Trenne, Utica, and Timothy R. Schlax, Rochester, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed June 24, 1976, Ser. No. 699,506
Int. Cl.² F02P 5/04
U.S. Cl. 123—117 D **7 Claims**



1. A digital electronic ignition spark timing system applicable to an associated internal combustion engine for producing ignition initiating signals for effecting the interruption of the engine ignition system ignition coil primary winding energizing circuit, comprising:

means for producing a series of electrical signal pulses of a substantially constant preselected frequency;

means for producing a timing signal for each cylinder of said engine at a selected engine crankshaft position in degrees relative to piston top dead center;

means for counting said electrical signal pulses during each engine timing count period between successive said timing signals and producing a running total output binary coded number of said electrical signal pulses counted;

circuit means for accepting upon the initiation of each said engine timing count period the said running total output binary coded total number of said electrical signal pulses counted during the previous said engine timing count period and for storing this binary coded number until the initiation of the next said engine timing count period;

means responsive to said stored binary coded number for producing an output first binary code representation of the fractional portion of said stored binary coded number that the predetermined number of crankshaft degrees ignition spark engine speed advance corresponding to the engine speed at which said stored binary coded number of said electrical signal pulses may be counted during one said engine timing count period is of the number of engine crankshaft degrees between successive said timing signals;

means responsive to the intake manifold vacuum of said engine for producing digital signal representations thereof,

means responsive to said digital signal representations of intake manifold vacuum for producing output ignition spark vacuum advance binary code representations of the predetermined number of crankshaft degrees ignition

spark vacuum advance corresponding to the said intake manifold vacuum;

means responsive to one of said ignition spark vacuum advance binary code representations and said stored binary coded number for producing a second binary code representation of the quotient of the product of said ignition spark vacuum advance binary code representation multiplied by said stored binary coded number divided by the number of engine crankshaft degrees between successive said timing signals;

means for producing a third binary code representation of the sum of said first and second binary code representations;

means for producing a fourth binary code representation of the difference between said stored binary coded number and said third binary code representation;

a comparator circuit responsive to said fourth binary code representation and said running total output binary coded numbers for producing an ignition initiating signal when one of said running total output binary coded numbers is equal to said fourth binary code representation; and

circuit means responsive to each of said ignition initiating signals for interrupting said engine ignition system ignition coil primary winding energizing circuit.

4,052,968

AIR-TO-FUEL RATIO ADJUSTING SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

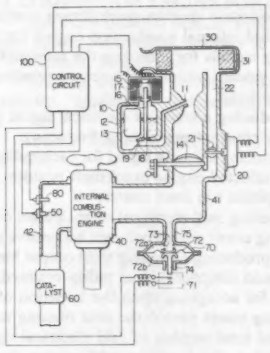
Tadashi Hattori, Nishio; Shigetaka Takada, Oobu; Fumio Sugi, Okazaki, and Takamichi Nakase, Gamagori, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Aug. 15, 1975, Ser. No. 605,175

Claims priority, application Japan, Aug. 19, 1974, 49-95355

Int. Cl.[2] F02D *1/04, 35/00, 33/00*; F02B *15/00*

U.S. Cl. 123—119 EC **10 Claims**



1. An air-to-fuel ratio adjusting system for an internal combustion engine comprising:

a carburetor connected to an intake pipe of an internal combustion engine for supplying air-fuel mixture to said engine;

said carburetor including

a main passage provided with a throttle valve for controlling the amount of the air-fuel mixture,

a bypass air passage provided with a bypass valve for compensating the air-to-fuel ratio of the air-fuel mixture by controlling the amount of air flowing therethrough,

a main fuel jet for supplying fuel through a nozzle opening to said main passage, the amount of said fuel being in proportion to the amount of air flowing through said main passage to produce an air-fuel mixture having an air-to-fuel ratio slightly higher than the stoichiometric one, and

an auxiliary fuel jet provided with a jet valve means for compensating the amount of fuel supplied through said nozzle to produce an air-fuel mixture having an air-to-fuel ratio slightly lower than the stoichiometric one;

an air-to-fuel ratio detecting means mounted in an exhaust pipe of said engine for detecting the air-to-fuel ratio of the air-fuel mixture supplied to said engine;

a bypass valve control circuit connected to said air-to-fuel ratio detecting means for producing a bypass valve control signal in accordance with the output of said air-to-fuel ratio detecting means;

a driving means coupled to and driving said bypass valve in response to said bypass valve control signal, whereby the amount of air flowing through said bypass air passage is controlled;

an engine condition detecting means for detecting a certain operation condition of said engine;

a jet valve control circuit connected to said engine condition detecting means for producing a jet valve control signal in accordance with the output of said engine condition detecting means; and

an actuating means for actuating said jet valve in response to said jet valve control signal, whereby the amount of fuel supplied from said auxiliary fuel jet is controlled.

4,052,969

EXHAUST GAS RECIRCULATION VALVE DEVICE FOR AN INTERNAL COMBUSTION ENGINE

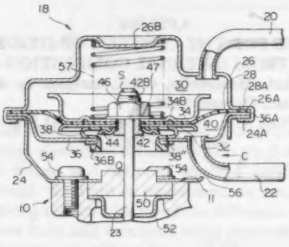
Masahisa Ando, Aichi; Keigo Katow, Toyota, and Masami Yamazaki, Toyokawa, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed June 9, 1976, Ser. No. 694,392

Claims priority, application Japan, Feb. 24, 1976, 51-18418

Int. Cl.[2] F02M *25/06*

U.S. Cl. 123—119 A **1 Claim**



1. A valve device for an exhaust gas recirculation system for an internal combustion engine, comprising:

a body forming a first passageway adapted for connection with the exhaust line of the engine and a second passageway adapted for connection with the intake of the engine;

a valve seat between the first and second passageways;

a valve member adapted for opening or closing the valve seat;

a diaphragm casing fixed on a surface of the body;

a diaphragm arranged across the interior of the casing so that a first chamber adapted for connection with an engine port is formed on one side of the diaphragm remote from said surface of the body, said diaphragm being secured to the casing at the periphery of the diaphragm;

a rod slidably supported by the body, one end of the rod being connected to the valve member;

a spring member within said first chamber of said diaphragm casing urging said diaphragm toward said body;

a set of first plates to hold the diaphragm therebetween;

a second plate having a central circular opening arranged across the interior of the casing between the diaphragm and said surface, the second plate being secured to the casing at the periphery thereof in such a manner that the second plate is parallel to and spaced from said surface;

a bellows member of sleeve shape made of rubber material

disposed between the diaphragm and the second plate forming on the side of the diaphragm near the body, a second chamber adapted for connection to another engine port, the bellows member having a circular groove on a first end thereof remote from the diaphragm, the circular groove being vacuum tightly fitted to the circular opening in the second plate, so that said first end of the bellows member is fixedly secured to the second plate;

a sleeve member secured to the other end of the valve rod away from the valve member, said sleeve member having a flange portion and a stem portion having a thread thereon, which stem portion passes through an opening formed on a second end of the bellows member near the diaphragm and through an opening formed on the diaphragm sandwiched by said set of first plates;

a ring member on said stem portion having a surface engaging said flange portion, said ring member being between said flange portion of the sleeve member and one of said set of first places facing the opposite side of said surface of said ring member, said ring member having a portion which projects toward said diaphragm and which is fitted to a recess formed on said second end of the bellows member;

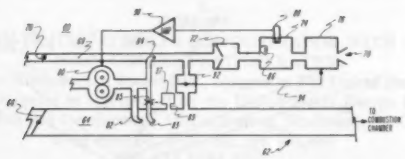
a nut member which is screwed onto said thread so that the second side of the bellows member made of rubber material is fixed to the diaphragm without undue deformation.

4,052,970

AIR-FUEL RATIO CONTROL SYSTEM UTILIZING OXYGEN SENSOR AND PRESSURE DIFFERENTIAL SENSOR

Frank Niertit, Webster, and Donald C. Rimlinger, Holcomb, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Feb. 24, 1976, Ser. No. 660,906
Int. Cl.[2] F02M 7/16
U.S. Cl. 123—139 AW **4 Claims**



1. A method for controlling the air-fuel ratio in an internal combustion engine having a combustion chamber arranged to operate at the subatmospheric pressures, an intake manifold communication with the combustion chamber for providing a flow of air to the combustion chamber, adjustable throttle means in the intake manifold for controlling the flow of air through the intake manifold, a relative vacuum thereby being produced in the intake manifold, and fuel pumping means for providing a flow of fuel into the intake manifold, and producing an air-fuel mixture, the method comprising the steps of:

drawing a flow of air through an air intake means spaced apart from the intake manifold and having a second throttle adjustable with the first throttle means;

providing a flow of fuel into the air intake means for producing an air-fuel mixture;

continuously sampling the air-fuel ratio of the mixture in the air intake means;

continuously adjusting the air-fuel ratio in the air intake means to a predetermined value by adjusting the flow of fuel into the air intake means;

continuously equalizing the pressure in the intake manifold and the air intake means by adjusting the rate of flow of air into the air intake means;

adjusting the flow of fuel into the intake manifold for producing a mixture which has an air-fuel ratio which is significantly less than the predetermined value in the intake manifold when the relative vacuum in the intake manifold is greater than a preselected amount, and

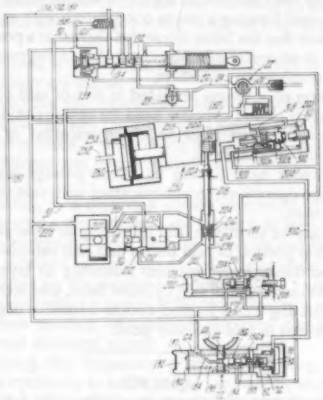
increasing the rate of flow of fuel into the intake manifold for producing a mixture which has an air-fuel ratio which is significantly greater than the predetermined amount only when and as long as the relative vacuum in the intake manifold is less than the preselected amount.

4,052,971

FUEL INJECTION PUMP AND TIMING CONTROL THEREFOR

Daniel E. Salzgeber, Windsor; Robert Raufeisen, and Charles W. Davis, both of Simsbury, all of Conn., assignors to Stanadyne, Inc., Hartford, Conn.

Filed Oct. 10, 1975, Ser. No. 621,608
Int. Cl.[2] F02M 59/20
U.S. Cl. 123—139 AQ **17 Claims**



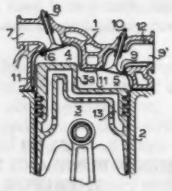
1. In a fuel injection pump for an associated internal combustion engine, pump plunger means providing sequential pumping strokes, means for changing the timing of the pumping strokes comprising a cylinder, an advance piston movable in said cylinder, means interconnecting said advance piston with said pump plunger means to advance and to retard the relative timing of the pumping strokes, a first source of fluid having a pressure correlated with engine speed, means operatively connected to said advance piston for moving said advance piston in response to said first pressure to change the relative timing of said pumping strokes including a source of operating fluid under pressure to power said advance piston, a conduit for delivering said operating fluid to said advance piston, and gating means in said conduit responsive to said first fluid pressure for disabling said operation of said advance piston moving means so that said advance piston is in a position corresponding with a fully retarded relative timing of pumping up to a predetermined speed, said gating means comprising a fuel limiting plunger intersecting said conduit to control the flow of said operating fluid to said advance piston, and means operatively connected to said fuel limiting plunger to move the same in response to said first fluid pressure for changing the maximum fuel charge delivered to the pump plunger means.

4,052,972

INTERNAL COMBUSTION ENGINE

Tokuichi Mizunuma, Hachioji; Hisamitsu Yamazoe, Oume, and Isao Matsuno, Hachioji, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 8, 1976, Ser. No. 665,103
Claims priority, application Japan, Mar. 14, 1975, 50-35269[U]
Int. Cl.[2] F02B *23/00*; F01B *31/08*
U.S. Cl. 123—191 R 5 Claims



1. A heat insulation construction for gasoline engines comprising

a cylinder having a top,

a piston reciprocably disposed in said cylinder, said piston having a top portion,

a sub-piston projecting from said top portion of said piston,

a cylinder head secured to the top of said cylinder having an inner wall forming a recess cooperating with said sub-piston such that the latter is inserted therein at a position near a top dead center of a piston stroke to form two independent combustion chambers,

an ignition plug means provided in one of said combustion chambers in said cylinder head for igniting said one combustion chamber prior to communication of said two combustion chambers,

said cylinder head having an intake passage and exhaust passage operatively communicating with said combustion chambers,

first means for forming a heat insulating air layer provided in said top portion of said piston and said sub-piston, and

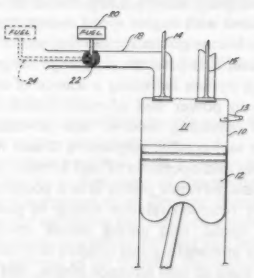
a second means forming a heat insulating air layer adjacent to said inner wall of said cylinder head, said second means constituting a cast formed hollow structure made of steel plates cast in said cylinder head.

4,052,973

INTERNAL COMBUSTION ENGINE AND A PROCESS FOR ITS OPERATION

Francis H. Clauser, Pasadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed June 28, 1973, Ser. No. 374,799
Int. Cl.[2] F02B *19/10, 19/16*
U.S. Cl. 123—32 ST 15 Claims



1. In a reciprocating internal combustion engine having for each cylinder an inlet valve, single induction channel means from atmosphere to the inlet valve for fuel and air delivery to the cylinder, a spark plug, and a unitary combustion chamber, an improvement which comprises:

a. means for injecting fuel into the induction channel means at a preselected location to form a coherent combustible cloud in a formation zone therein during the periods of time that the inlet valve is closed, the amount of fuel injected by the injection means effecting an air-to-fuel ratio in the combustion chamber determined on the basis of a homogeneous charge that just prior to the occurrence of spark is too lean to burn;

b. the induction channel means providing a space for a cloud free zone for air between the zone of cloud formation and the spark plug such that upon opening of the inlet valve the cloud will be inducted into the combustion chamber serially with air ahead of it for presence of the cloud at the spark plug when spark occurs and presence of the previously inducted air in a fuel-lean zone in the combustion chamber outside the cloud when spark occurs; and

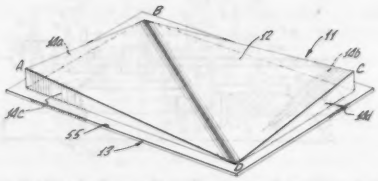
c. the induction channel means and the combustion chamber having a configuration to avoid substantial dissipation of the cloud during the time of the cloud's formation and induction into the combustion chamber to the spark plug until spark occurs so that the combustion chamber just prior to the occurrence of spark has a heterogeneous makeup of fuel and air with the cloud being fuel-rich relative to stoichiometric and the gases in the fuel-lean zone being fuel lean.

4,052,974

TUBELESS SOLAR COLLECTOR

Marcel Vataru, Los Angeles, Calif., assignor to Philip M. Hinderstein, Orange, Calif., a part interest

Filed July 21, 1976, Ser. No. 707,202
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—270 20 Claims



10. A solar collector comprising:

an upper plate, a lower plate, and a plurality of side plates, said plates defining an enclosed chamber, said upper plate being highly absorbent of solar radiation, said upper plate curving inwardly from said side plates so that a central portion thereof extends closely adjacent said lower plate, along a hot line extending across said collector; and

means for conducting a fluid into and out of said chamber, on opposed sides of said hot line, said fluid flowing through said chamber, perpendicular to and in a thin sheet past said hot line, and absorbing heat from said upper plate, wherein said lower plate is curved outwardly along said hot line to permit support thereof along the edges only.

4,052,975

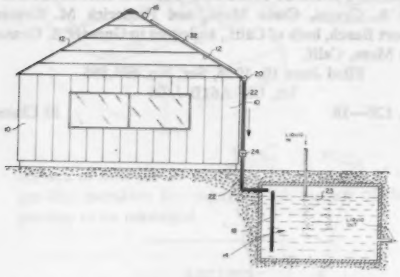
SOLAR HEAT COLLECTOR AND STORAGE SYSTEM

John W. Ceideburg, P.O. Box 259, Aptos, Calif. 95003

Filed May 20, 1976, Ser. No. 688,249
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 6 Claims

1. A solar heat collector and storage system including: a receptable for a heat storage solution having a relatively low

evaporation rate compared with water; a structure having an inclined roof; a first pipeline extending from the receptacle to an upper position on the roof; an apertured pipeline coupled to said first pipeline and extending along the roof at said upper position thereon; pumping means coupled to the first pipeline for circulating the solution from the receptacle through the first pipeline to said apertured pipeline at the upper position on the roof to permit the solution to pass through openings in said apertured pipeline and to flow freely across the roof in an exposed condition to the atmosphere from the upper position to a lower position on the roof, so that the solution may absorb



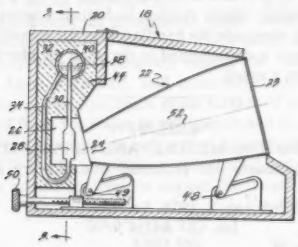
heat from the sun as the solution moves across the roof from the upper position to the lower position to have a higher temperature at the lower position as compared with the temperature at the upper position; collector means comprising a slotted pipeline extending along the roof and mounted at the lower position on the roof to collect the heated solution at the lower position; a drain pipe coupled to the slotted pipeline to return the heated solution to the receptable; means in said receptacle for deriving heat from the heated solution therein; and a diversion valve coupled to the drain pipeline and settable to a position in which the flow of liquid in the drain pipeline is prevented from returning to the receptacle.

4,052,976

NON-TRACKING SOLAR CONCENTRATOR WITH A HIGH CONCENTRATION RATIO

Henry Hinterberger, Batavia, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 30, 1976, Ser. No. 701,480
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **11 Claims**



1. In a radiant energy concentration and collection device having a reflector for concentrating incident radiation to a location with the position of the location varying with time, and an energy receiver upon which the location is directed, the improvement in said receiver comprising:

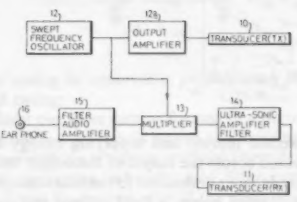
a header, a plurality of bulbs, and thin tubes, each of said thin tube coupling one of said bulbs to said header, said bulbs being positioned in the receiver so that the location is always incident on at least one bulb, said bulbs containing a fluid, with the location incident on a particular bulb the fluid therein boils, thereby producing heated gas which collects in said header, and utilization means coupled to said header for utilizing said heated gas.

4,052,977

METHODS OF AND APPARATUS FOR ASCERTAINING THE CHARACTERISTICS OF MOTION OF INACCESSIBLE MOVING ELEMENTS

Leslie Kay, 82 Scarborough Road, Christchurch, New Zealand

Filed July 17, 1975, Ser. No. 596,656
Claims priority, application New Zealand, July 15, 1974, 174850; United Kingdom, July 24, 1974, 32661/74
Int. Cl.² A61B *10/00*
U.S. Cl. 128—2 V **23 Claims**



1. A method of obtaining a signal containing information as to the characteristics of at least one oscillatorily moving element situated internally of a living body, such method comprising:

a. generating an alternating signal herein called the transmitting electrical signal;

b. transducing the transmitting electrical signal into stress wave energy and radiating such energy at a transmitting station externally of the body and spaced a distance from the element and in a direction to be incident on the element;

c. receiving, at a receiving station externally of the body, and spaced a distance from the element, at least part of the wave energy reflected from the element and transducing such received energy into a received electrical signal;

d. operating on the received electrical signal to produce an electrical output signal of difference frequency as between the then existing transmitting electrical signal and the received electrical signal;

e. sweeping the frequency of the transmitting electrical signal cyclically in sufficiently long sweeps, with a predetermined frequency vs. time pattern and sufficiently wide band frequency excursion range during each cycle so related to the distances of the transmitting and receiving stations from the element and the movement of the element that the difference frequency is in the audible range of frequencies containing an audibly discernible frequency pattern identifying variations in displacement of the position of the element and motion of the element; and

f. transducing the audible range of frequencies containing such audibly discernible frequency pattern of the electrical output signal into an audible output signal.

4,052,978

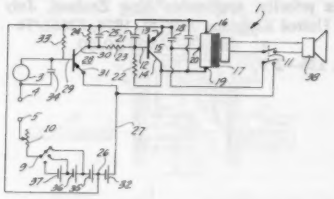
ELECTRO-THERAPY APPARATUS

Amado Eugenio, 2675 Zamora St., Pasay City, Philippines

Filed Jan. 19, 1976, Ser. No. 650,234
Claims priority, application Philippines, Jan. 23, 1975, 16736
Int. Cl.² A61B *5/05*; A61H *39/00*
U.S. Cl. 128—2.1 Z **4 Claims**

1. An electro-therapy apparatus for detecting malfunction of body organs via the autonomous nervous system, comprising, in combination, a transistorized oscillator-audio amplifier stage including an output transformer operative for dissipating the energy of the oscillator-audio amplifier stage, including an oscillator and audio-amplifier transistor connected to the out-

put transformer and means for feeding back to the base of the transistor a feedback voltage derived from the voltage across the output transformer to cause the oscillator and audio-amplifier transistor to oscillate at a predetermined basic frequency dependent upon the time-constant of the feedback network of the stage; biasing network means for applying biasing voltage to the oscillator-audio amplifier stage; triggering stage means coupled to the biasing network means and operative for varying the biasing voltage thereof, the triggering stage means including a bias voltage network and a series of



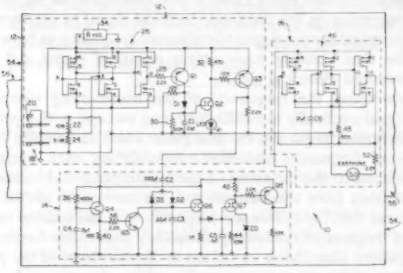
batteries connected thereto and supplying energy thereto; a speaker connected across the output of the output transformer; a pair of electrode jacks connected to the bias voltage network of the triggering stage means, a fixed resistor and an ammeter both connected to the bias voltage network of the triggering stage means; and a pair of electrodes removably connected to the electrode jacks and adapted to be placed upon the surface of the human body for establishing a flow of current in the triggering stage means when contacting an electropermeable location on the surface of the human body.

4,052,979

JEWELRY AND BRACELET HEARTBEAT MONITOR

Mary Ann Scherr, and Harry L. Hosterman, both of Akron, Ohio, assignors to Mary Ann Scherr, Akron, Ohio

Filed Dec. 4, 1975, Ser. No. 637,726
Int. Cl.² A61B *5/02*
U.S. Cl. 128—2.05 P **8 Claims**



1. A device for monitoring the heartbeat of an individual at a pulse point and for emitting a warning signal when such heartbeat exceeds a critical rate, comprising:

first and second piezo-electric sensor means differentially connected to each other for presenting an output signal characteristic of the heartbeat;

an amplifier means connected to said first and second sensor means for receiving and amplifying said output signal;

a squaring circuit means connected to said amplifier means for creating a square wave pulse on receipt of the amplified signal from said amplifier means;

a first charging capacitor means connected to said squaring circuit means for receiving said square wave pulses and charging in relation to the receipt of such pulses;

a voltage supply;

a second charging capacitor means connected to said voltage supply and charging at a predetermined rate;

an alarm circuit means for creating an alarm signal upon excitation; and

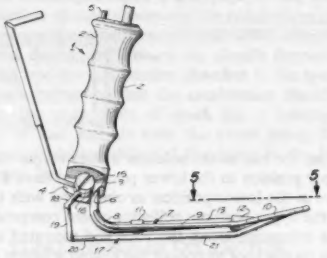
an alarm excitation circuit means interconnected among said first and second charging capacitor means and said alarm circuit means for exciting said alarm circuit means if said first charging capacitor means reaches a first level of charge before said second charging capacitor means reaches a second level of charge.

4,052,980

TRIAXIAL FIBEROPTIC SOFT TISSUE RETRACTOR

Guenter A. Grams, Costa Mesa, and Frederick M. Grazer, Newport Beach, both of Calif., assignors to Guenter A. Grams, Costa Mesa, Calif.

Filed June 10, 1976, Ser. No. 694,895
Int. Cl.² A61B *1/06*
U.S. Cl. 128—18 **10 Claims**



1. A surgical instrument for insertion through an incision of minimal dimension into a cavity therebeyond, said instrument comprising:

a. a handle means;

b. a set of fingers extending therefrom and normally disposed in contiguous relation for insertion through the incision into the cavity;

c. means for causing the fingers to diverge with minimal divergence in the region of the incision and maximum divergence at the extremities of the fingers within the cavity thereby to effect retraction of the cavity walls;

d. the set of fingers including a relatively fixed pair of fingers joined at their extremities and a second pair of fingers;

e. the diverging means including a pair of pivot members movable about converging axes, and the second pair of fingers are secured thereto for diverging movement from the fixed fingers and from each other;

f. the diverging means further including a lever member extending alongside the handle means for manual gripping engagement and connected to the pivot members to effect movement thereof.

4,052,981

MASSAGING METHOD AND APPARATUS

Robert J. Bachmann, 635 Highland Ave., Cherry Hill, N.J. 08034

Filed Aug. 3, 1976, Ser. No. 711,298
Int. Cl.² A61H *9/00*
U.S. Cl. 128—36 **7 Claims**

1. A portable device conforming to a body portion of an animal for massaging the body portion, said device comprising:

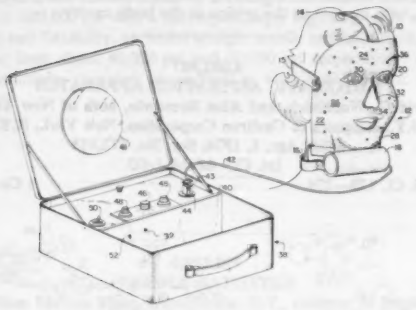
a means for generating a plurality of vibrations which includes

a housing, and

a plurality of variable speed motors mounted on said housing;

a pliable member with an external surface and an internal surface having a shape conforming to the part of the body to be massaged, said housing being mounted to said pliable member along one edge thereof; and

a plurality of flexible and resiliently compressible finger-like members mounted at one end thereof to said internal



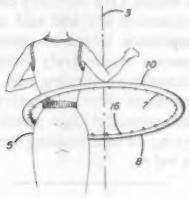
surface of said pliable member, the other end of said finger-like members for engaging the surface of the body portion to be massaged.

4,052,982

MASSAGE HOOP

Gennady Ozeryansky, Regency Park, 105 E, Guilderland, N.Y. 12084

Filed Oct. 4, 1976, Ser. No. 729,264
Int. Cl.[2] A61H *15/00*
U.S. Cl. 128—57 13 Claims



1. A massage hoop which comprises:

A. a rigid hoop member having a circumference suitable for rotation about a person's waist by a hula-type motion of the person, said hoop member having an inside outer surface facing the waist; and

B. a multiplicity of protrusions fitted about and radially extending inwardly from the inside outer surface so that the protrusions successively engage the waist as the massage hoop is rotated, said protrusions having a height, measured from the inside outer surface of the hoop member, of from 3 to about 30 millimeters and having a spacing between a protrusion and a next nearest protrusion sufficient to create a multiplicity of distinct depressions in the waist as said protrusions engage the waist.

4,052,983

NASAL FILTER

Coy R. Bovender, 6123 Auburndale Drive, Greensboro, N.C. 27410

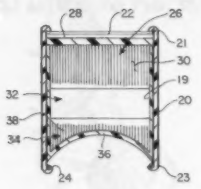
Continuation-in-part of Ser. No. 610,259, Sept. 4, 1975, abandoned. This application Nov. 22, 1976, Ser. No. 743,631
Int. Cl.[2] A62B *7/10*
U.S. Cl. 128—140 N 7 Claims

1. A filter device for insertion into the nasal passage comprising:

a. a hollow casing formed of a soft pliable material and having an outer transverse dimension shaped substantially to conform to the contour of the inner wall of the nasal passage and an inner transverse dimension;

b. a removable and disposable filter cartridge means carried within said casing and comprising:

i. a housing having outer transverse dimensions closely corresponding to the inner transverse dimensions of



said casing for removable, yet stationary support within said casing;

ii. at least one filter section formed of a porous membrane extending transversely across said housing;

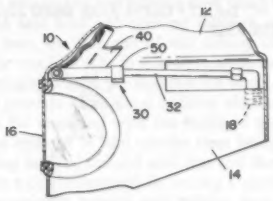
iii. a multiplicity of minute artificial fibers depending from said membrane, whereby said filter cartridge means simulates the natural cilia of the mucous membrane.

4,052,984

PLENUM TYPE AIR DISTRIBUTION SYSTEM FOR HEAD ENCLOSURE

Brock F. Brockway, Mill Valley, Calif., assignor to E. D. Bullard Company, Sausalito, Calif.

Filed Mar. 25, 1976, Ser. No. 670,190
Int. Cl.[2] A62B *17/04*
U.S. Cl. 128—142.7 11 Claims



1. In combination, a head protective enclosure and apparatus for distributing air and attenuating sound within said enclosure comprising a microporous elastomeric air sack defining a substantially closed volume having walls with an exterior area that is a substantial portion of the area of the interior walls of said enclosure and means for supplying air under pressure to said substantially closed volume whereby air is diffused only through the micropores of said elastomeric air sack and sound is attenuated by the walls of said air sack and wherein said means for supplying air under pressure to said substantially closed volume comprises a tube extending within said volume and having an opening within said volume.

4,052,985

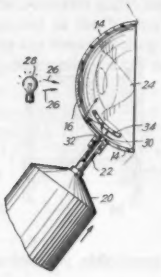
APPARATUS FOR MEDICINALLY SPRAYING AN EYEBALL

D. Jackson Coleman, 223 Maple St., Haworth, N.J. 07641, and Stephen L. Trokel, 1192 Park Ave., New York, N.Y. 10028

Filed June 28, 1976, Ser. No. 700,481
Int. Cl.[2] A61M *11/00*
U.S. Cl. 128—173 R 15 Claims

1. An ophthalmic spray applicator which comprises a generally hemispherical eyecup, a baffle adjacent the annular periphery of said eyecup and within the lower portion of said eyecup, said baffle being generally parallel to and spaced from the inner

surface of said eyecup with the lateral ends or entire lower periphery of said baffle being attached to the inner surface of said eyecup, means to project an ophthalmic solution into the lower portion of said eyecup opposite said baffle, so that said solution impinges on said baffle rather than directly impinging



on an eyeball, said solution thereby being effectively dispersed into a mist of small droplets within said eyecup, and means in said eyecup to attract vision, said means to attract vision being rearward from both the annular periphery of said eyecup and said means to project an ophthalmic solution.

4,052,986

DEVICE FOR INTRODUCING MEDICAMENTS OR THE LIKE INTO BODY CAVITIES

Colin Scaife, Cottingham, England, assignor to Reckitt & Colman Products Limited, London, England

Filed Sept. 19, 1975, Ser. No. 615,104

Claims priority, application United Kingdom, Oct. 9, 1974, 43787/74; Feb. 6, 1975, 5183/75

Int. Cl.² G61M *3/00*; B65D *35/20*

U.S. Cl. 128—260 **7 Claims**

1. An improved enema device of the type including a container having a resilient, deformable body portion defining an enclosed space, the improvement comprising:

a. a first end having a first frangible closure, said first end having means for admitting air from the exterior of said body portion into said enclosed space and for restraining flow of container contents out of said enclosed space to the exterior of said body portion, said admitting and restraining means including a one-way air inlet valve;

b. a second end having means for selectively providing, prior to use, an open dispensing applicator shaped for non-traumatic insertion into an orifice in a body cavity, said providing means including a second frangible closure for exposing said enclosed space;

c. said second end also being shaped to make sealing contact with respect to the orifice in the body cavity.

4,052,987

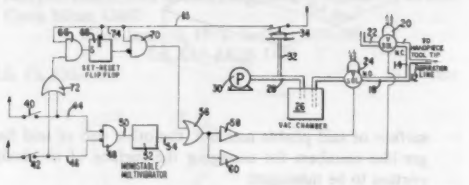
AUTOMATIC ASPIRATION APPARATUS

David G. Wuchinich, and Alan Broadwin, both of New York, N.Y., assignors to Cavitron Corporation, New York, N.Y.

Filed Apr. 1, 1976, Ser. No. 672,813

Int. Cl.² A61M *1/00*

U.S. Cl. 128—276 **6 Claims**



1. Apparatus for controlling aspiration from an operative site during surgery, said apparatus comprising:

vacuum source means for providing a vacuum that is available continously;

means connected to said source means for aspirating the operative site that includes (1) a normally open aspiration valve between the operative site and said source means, (2) vacuum pressure sensing means between said aspiration valve and said source means for sensing pressure in said aspiration means, (3) a normally closed venting means between the operative site and said aspiration valve for venting said aspiration means to about ambiant pressure, and (4) logic means responsively coupled to said sensing means for automatically opening said venting means and closing said aspiration valve, and activation control means coupled to said automatic logic means for overriding the automatic opening of said venting means and closing of said aspiration valve.

4,052,988

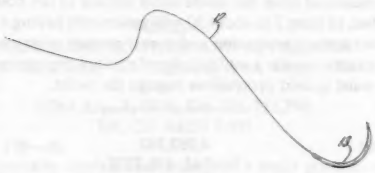
SYNTHETIC ABSORBABLE SURGICAL DEVICES OF POLY-DIOXANONE

Namassivaya Doddi; Charles C. Versfelt, both of Somerville, and David Wasserman, Springfield, all of N.J., assignors to Ethicon, Inc., Somerville, N.J.

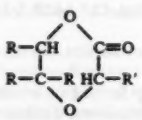
Filed Jan. 12, 1976, Ser. No. 648,236

Int. Cl.² A61L *17/00*

U.S. Cl. 128—335.5 **39 Claims**



1. A sterile, synthetic absorbable suture comprising oriented fiber of a polymer of a monomer having the formula:



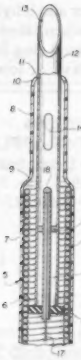
wherein R' and R are individually hydrogen, methyl or ethyl, said suture being dry to the extent of being substantially free of moisture, and characterized by a Young's modulus of less than about 600,000 psi with a correspondingly high degree of softness and flexibility, an initial straight tensile and knot strength of at least about 40,000 psi and 30,000 psi respectively, and substantially complete absorption in vivo within about 180 days.

4,052,989

NEEDLE CATHETER

William Mathes Kline, Gloversville, N.Y., assignor to Medical Evaluation Devices and Instruments Corporation, Gloversville, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,066
Int. Cl.² A61M *25/00*
U.S. Cl. 128—349 R **2 Claims**



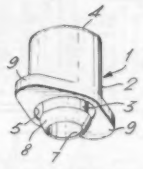
1. In a needle catheter wherein is provided a lumen-defining flexible tubular body having proximal and distal ends, a relatively short puncture needle frictionally retained within the distal end portion of said tubular body and means for proximally retracting said puncture needle through the lumen of said tubular body; the improvement in which said tubular body is formed with a lumen having a diameter greater than the outside diameter of said puncture needle and in which at least the distal end portion of said tubular body is transparent whereby to provide a sight zone surrounding the associated portion of said puncture needle, said puncture needle being hollow and being provided with a radial aperture located in registry with a portion of said sight zone for passage of fluid thereinto when said puncture needle is inserted into a fluid-containing vessel, said tubular body comprising an inner wall formed from a continuous helical spring with the helices thereof in contact with each other and an outer sheathing of smooth inert plastic material firmly bonded thereto, said outer sheathing extending distally beyond the distal end of said spring to define a hollow tip having proximal and distal ends, the proximal end of said hollow tip being configured to restrain said spring against axial elongation in a distal direction, the distal end of said hollow tip being configured to define an annular lip of reduced diameter for frictional engagement with and sliding retention of said puncture needle; and in which means slidably retained within said tubular body in association within the proximal end of said puncture needle are provided for preventing fluid flow around the exterior of said needle proximally beyond the proximal end thereof.

4,052,990

MEDICO-SURGICAL TUBE AND ADAPTOR

Roy Howard Dodgson, Hythe, England, assignor to Smiths Industries Limited, London, England

Continuation of Ser. No. 461,202, April 15, 1974, abandoned. This application July 23, 1975, Ser. No. 598,315
Claims priority, application United Kingdom, Apr. 16, 1973, 18193/73
Int. Cl.² A61M *25/00*; F16L *55/00*
U.S. Cl. 128—351 **1 Claim**



1. A tracheal-tube assembly, comprising a tracheal tube of resilient material having an open proximal end, a device retained in said proximal end of the tracheal tube for coupling the tube to a gas-circuit passageway having a diameter larger than that of said tracheal tube, said device having a substantially cylindrical body portion which has a base that is provided with a flared aperture, the diameter of said cylindrical body portion being dimensioned for close-fitting insertion into said gas-circuit passageway to establish said coupling, and said device having an open-ended tubular stem which is integral with and extends in one direction only away from the said base, the diameter of said tubular stem being less than that of said cylindrical body portion and said stem diameter being dimensioned for close-fitting insertion of said stem into said proximal end of the tracheal tube, one end of said tubular stem being located at and integral with said base and opening through said flared aperture in said base, the free end of said tubular stem being located within the tracheal tube in spaced relation to said base and having an integral tubular portion thereof which is turned back on itself to provide an external resilient claw at the free end of said stem for engaging with the inside of the resilient tracheal tube, the exterior of said tubular stem being smooth-surfaced and being tapered toward said free end thereof, said claw extending as a circumferential lip having a smoothly free edge disposed completely around said tubular stem between the opposing ends of said stem and within said proximal end of the tracheal tube, the resilient tracheal tube bearing up over the claw to hug the tubular stem tightly and resiliently between said claw and said base to provide a gas-tight seal therewith, and said resilient claw splaying outwardly from the tubular stem away from the said free end of said stem and being directed toward said base thereby to flexibly engage the interior surface of the tracheal tube for resisting withdrawal of the tracheal tube and stem from one another to maintain said tracheal tube and said device in assembled relation to one another when said cylindrical body portion of said device is inserted into and removed from said gas-circuit passageway.

4,052,991

METHOD OF STIMULATING THE HEART

Fred Zacouto, 16 rue de la Convention, Paris 15, France

Continuation of Ser. No. 536,602, Dec. 26, 1974, abandoned, which is a division of Ser. No. 126,069, March 19, 1971, Pat. No. 3,857,399. This application Sept. 25, 1975, Ser. No. 616,881
Int. Cl.² A61N *1/36*
U.S. Cl. 128—419 PG **10 Claims**

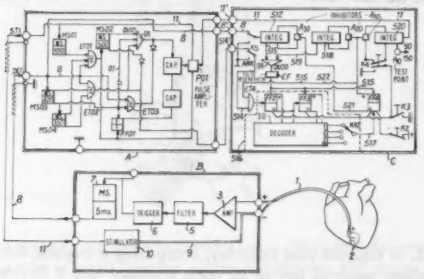
1. A method of electrically stimulating the cardiac muscle by means of an automatic device comprising heart stimulating and detecting means, which method comprises the steps of:

A. detecting heart signals including spontaneous heart signals,

B. transmitting electrical stimulating pulses to the cardiac muscle at a predetermined frequency in the absence of a spontaneous heart signal,

C. suspending the transmission of an electrical stimulating pulse for a waiting period when a spontaneous signal is detected,

D. detecting among said detected spontaneous heart signals, those which are dangerous,



E. counting said dangerous heart signals,

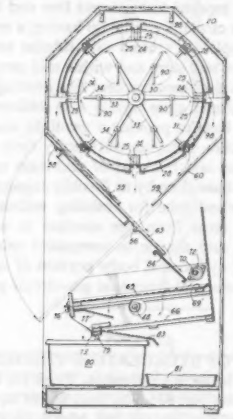
F. and, if a predetermined number of said dangerous heart signals is counted during occurrence of a total predetermined number of said detected heart signals, transmitting electrical stimulating pulses to the cardiac muscle with temporarily increased frequency.

4,052,992

SHELLING MACHINE

George F. Taylor, P.O. Box 625, Moultrie, Ga. 31768

Continuation-in-part of Ser. No. 596,434, July 16, 1975, abandoned. This application Mar. 1, 1976, Ser. No. 662,709
Int. Cl.[2] A01F *9/00*
U.S. Cl. 130—30 H 11 Claims



1. A machine for shelling beans, peas and other legumes comprising a generally cylindrical, rotatable screen drum; shroud means mounted about said cylindrical screen in spaced relation therewith for restricting the passage of legumes therethrough; a plurality of axially spaced sets of paddles mounted for rotation within said cylindrical screen; and drive means for rotating said drum and said sets of paddles.

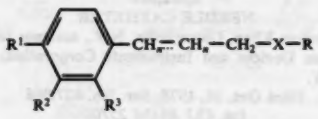
4,052,993

CINNAMIC DERIVATIVES AS TOBACCO ADDITIVES

William F. Cartwright, Manchester, Conn.; Richard E. Means; Andrew G. Kallianos, both of Durham, N.C., and J. Bowen Ross, Jr., assignors to Liggett & Myers Incorporated, Durham, N.C.

Division of Ser. No. 486,841, July 9, 1974, Pat. No. 3,943,943. This application Dec. 15, 1975, Ser. No. 640,817
Int. Cl.[2] A24B *3/12*
U.S. Cl. 131—9 18 Claims

15. An improved charcoal filter cigarette wherein the improvement comprises a tobacco composition containing an amount of a cinnamic derivative sufficient to reduce the "charcoal effect" of said cigarette, said cinnamic derivative having the selected formula:



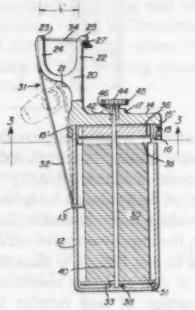
wherein X is sulfur; n is 1; each of R^1, R^2, and R^3, when taken separately, is hydrogen, lower alkyl, hydroxy, lower alkoxy, or lower acyl; and R^1 and R^2, when taken together, form a divalent radical which forms a fused ring of from 5 to 6 members; and R is hydrogen, lower alkyl, or lower acyl.

4,052,994

DENTAL FLOSS APPLICATOR

Floyd A. Thun, 645 Adelaide Drive, Santa Monica, Calif. 90402

Filed Apr. 12, 1976, Ser. No. 676,049
Int. Cl.[2] A61C *15/00*
U.S. Cl. 132—92 R 5 Claims



1. A dental floss applicator comprising; a floss holding receptacle for receiving a spool of dental floss, a removable cover for the receptacle, means between the cover and the spool of floss contained within the receptacle for applying tension friction thereto, an U-shaped structure mounted on the top of the removable cover for holding a length of floss between the tips of the U-shaped structure, further means for permitting additional tension to be applied to the length of floss between the tips of the U-shaped structure as the applicator is being used for teeth cleaning purposes, the means between the cover and the spool of dental floss for applying friction thereto including a washer of resilient material between the inside of the receptacle cover and the spool of floss, the further means including a recessed outer edge of the dental floss supporting U-shaped structure which is designed for reception and engagement by a user's index finger with a portion of the floss therebetween, the U-shaped supporting structure including an upright extending member with a notch at the outer tip thereof, another extending member projecting outwardly and

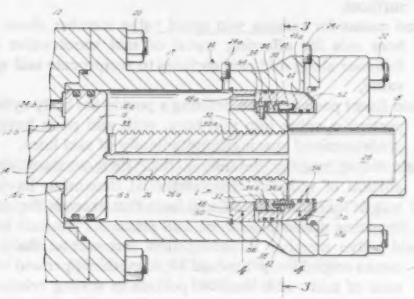
upwardly from the first member and parallel thereto at the outer portion thereof, the second outwardly extending member also having a notch on the outer tip thereof, the washer of resilient material being made of sponge rubber, with rewind mechanism associated with the spool of dental floss, the rewind mechanism including a flanged serrated disk at one end of the spool of dental floss, and an access slot appropriately provided in the receptacle so as to be opposite said serrated flange for access to the serrations thereon for the purpose of applying rewind movement to the spool of dental floss.

4,052,995

BLOWOUT PREVENTER RAM LOCK AND LOCKING METHOD

C. Mack Ellison, Houston, Tex., assignor to Hydril Company

Filed Aug. 19, 1975, Ser. No. 605,857
Int. Cl.² E21B *33/06*
U.S. Cl. 137—1 **32 Claims**



1. In a blowout preventer having at least one blowout preventer ram, a ram lock for locking the ram at an adjustable closed position for sealing contact with a well pipe or the like in a bore of the blowout preventer, comprising:

a. a ram carrier means comprising a ram piston having a piston rod with a threaded surface formed thereon for moving the ram to an initial closed position in the blowout preventer in response to closing fluid pressure;

b. lock means continuously engaged with said ram carrier means during movement thereof and permitting movement of said ram carrier means to the initial closed position and the adjustable closed position of the ram to increase the sealing contact thereof to a desired level, said lock means comprising:

1. a lock nut having a threaded surface formed thereon and engaged by said threaded surface on said ram piston rod for rotational movement with respect thereto during movement of the ram to the closed position;

2. a lock nut ratchet ring fixedly mounted with said lock nut for movement therewith, said lock nut ratchet ring having ratchet teeth formed thereon;

3. a restraining ratchet ring having ratchet teeth formed thereon; and

4. said teeth of said lock nut ratchet ring and said restraining ratchet ring permitting unrestrained movement of the ram to the closed position, and further being energizable to lock the ram against reverse movement; and

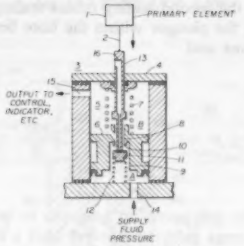
c. means for energizing said lock means to lock the ram in place at the adjusted closed position comprising means responsive to the closing fluid pressure to energize said lock means, wherein the ram is locked at adjustable sealing positions by said lock means.

4,052,996

FLUID PRESSURE RELAY

Billy Steve Burrus, Tulsa, Okla., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed May 24, 1976, Ser. No. 689,607
Int. Cl.² G05D *16/10*
U.S. Cl. 137—85 **3 Claims**



1. A fluid pressure, non-bleed, position pilot valve, including,

a housing having a straight cylindrical bore,

a piston within the housing bore and sealed to the walls of the housing bore to divide the housing bore into two chambers,

a bore extended through the piston and parallel to the piston path in the housing bore,

a seat within the bore through the piston and between the chambers on each side of the piston,

a plug element positioned within the bore through the piston and urged by a spring toward engaging the seat within the bore through the piston,

a spring mounted within the housing bore chamber opposite the plug element to exert its force on the piston in moving the piston seat toward the plug element,

a supply of power fluid connected to the housing bore chamber on the plug element side of the piston,

an outlet for the fluid pressure generated in the housing bore chamber on the side of the piston opposite the plug element,

and a tube extending its open end into the piston bore seat to engage the plug element to first move the plug element from the piston bore seat and next move away from engagement with the plug element to vent the housing bore chamber on the side of the piston opposite the plug element,

whereby each position of the tube will develop a differential pressure across the piston which will move the piston until the plug element engages the piston seat and open end of the tubular positioner to seal the housing chambers on each side of the piston from each other and the chamber opposite the plug element from exhaust through the tubular positioner.

4,052,997

LEAK DETECTION ARRANGEMENT FOR VALVE HAVING SEALING MEANS

Bruce L. De Lorenzo, and Daniel J. McCarthy, both of P.O. Box 72, Clifton, N.J. 07015

Continuation of Ser. No. 309,903, Nov. 27, 1972, abandoned. This application Oct. 20, 1975, Ser. No. 624,199
Int. Cl.² F16K *31/06*
U.S. Cl. 137—312 **4 Claims**

1. Valve construction comprising:

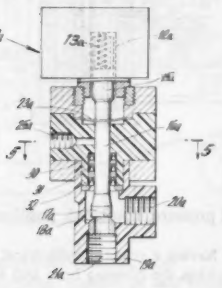
actuating means,

a valve body having a fluid inlet passage and a fluid outlet passage, a valve seat between said inlet and outlet passages and a bore above the valve seat,

a valve flow control plunger operatively arranged between the actuating means and the valve seat and extending

through the bore in the valve body in substantially continuous slidable relation therewith and responsive to the actuating means for movement relative to the valve seat for correspondingly controlling fluid flow through the valve seat from the inlet passage to the outlet passage,

spaced apart first and secnd sealing means correspondingly situated in the vicinity of each end portion of the bore for sealing against fluid flow through and bore to the actuating means, the second sealing means sealing against fluid flow along the plunger within the bore beyond the first sealing means, and



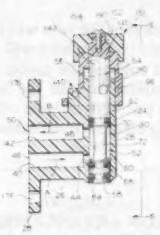
a leak detection and relief passage extending from the interior of the valve body outwardly to the exterior thereof and located between the first and second sealing means and communicating directly with the bore for the flow of any fluid leaking past the first sealing means to a visible location outside of the valve body, the valve body being integral in the portion thereof between the first and second sealing means which extends outwardly from the bore and in which the leak detection and relief passage communicates with the bore.

4,052,998

THREE WAY COCK FOR FILTER PRESS PLATES

Hugh S. Robinson, Harbert, Mich., assignor to D. R. Sperry & Co., Aurora, Ill.

Filed Aug. 9, 1976, Ser. No. 712,784
Int. Cl.[2] F16K *11/07*
U.S. Cl. 137—625.5 **10 Claims**



1. A three way cock for securement to the side of a filter press plate, in vertically disposed operating position for controlling fluent discharge from the plate, said cock comprising:

a cock body defining a cylinder portion having a rectilinear bore that is vertically disposed in the cock operating position,

said body defining a discharge port at the lower end of said bore and being open at the upper end of said bore,

said body including a side flange portion coplanar with said bore and extending laterally of said bore,

said body further including a planar foot portion paralleling said bore,

with said body flange portion extending between said body cylinder and foot portions,

said body defining a pair of spaced apart parallel fluent passages extending normally of said bore and communicating with said bore intermediate said bore ends through said body flange, foot and cylinder portions, to correspondingly located passages in the plate side,

a spool valve member reciprocably received in said bore and proportioned lengthwise of said bore such that when the lower end of said spool is disposed at said lower end of said bore, the upper end of said spool projects from and above said upper end of said bore,

an end cap received over the upper end of the body cylinder portion and being apertured to freely receive said upper end of said spool,

said body and said end cap including interfitting lug means for keying said end cap to said body,

said body adjacent said upper end of said bore and said end cap being formed to define complementing opposed cam surfaces in generally spiralled relation about the axis of said bore for defining the reciprocating movement limits of said spool valve within said bore,

said spool valve having a cam follower riding on said cam surfaces,

and means for turning said spool valve member about said bore axis for effecting travel of said spool valve cam follower along said cam surfaces to reciprocate said spool valve,

said fluent passages each defining a port in the body cylinder portion opening into said bore, with said ports having a predetermined spacing longitudinally of said bore,

said valve member defining a fluid flow accommodating portion of reduced circumferential dimension having a length longitudinally of said bore that exceeds the corresponding distance between said ports,

said valve member including first and second fluid seal means respectively disposed adjacent the upper and lower ends of said valve member portion in sealing relation to said boy, and a third seal means adjacent the lower end of said valve member in sealing relation to said body and spaced below said second seal means a distance exceeding the width of the lower end of said ports for normally blocking fluent discharge from said body discharge port,

said foot portion being formed for securement against the plate side with said body passages aligned with the plate passages,

said cam surfaces being proportioned to, when said valve member is turned about said axis, shift said valve member seal means between a lower valve member position in which said first and second seal means receive said ports therebetween to an upper position in which said third means is disposed above the lower of said ports for effecting fluent discharge from said cock through said body discharge port,

said second and third seal means in a third operative position of said valve member intermediate said lower and upper positions being disposed on either side of said lower port for precluding fluid flow into said cock from the plate.

4,052,999

BUMPER WALL FOR PLASMA DEVICE

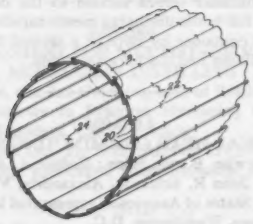
Thomas A. Coultas, Hinsdale, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 15, 1975, Ser. No. 596,043
Int. Cl.[2] F16L *9/10*
U.S. Cl. 138—158 **4 Claims**

1. An improved bumper wall for placement about a region containing a plasma, the improved bumper wall comprising

a plurality of strips of a refractory material, each of the strips overlapping a portion of the next of the strips to form an enclosed region partially surrounding the plasma region;

a plurality of webs, each of the webs connected to one of the strips in an area less than the surface area of the strips; and



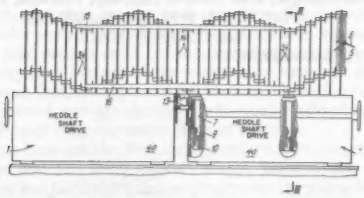
an outer structure of circular cross-section connected in rigid engagement to each of the webs, wherein the strips may flex with respect to one another by bending of the webs.

4,053,000

SHEDDING MECHANISM FOR TRAVELLING-WAVE LOOMS

Anatoly Grigorievich Selivanov, Donskaya ulitsa, 24, kv. 110, and Gennady Ivanovich Kovalev, Kronshtadsky bulvar, 27, kv. 85, both of Moscow, U.S.S.R.

Filed May 3, 1976, Ser. No. 682,391
Int. Cl.² D03D *47/26*
U.S. Cl. 139—436 **7 Claims**



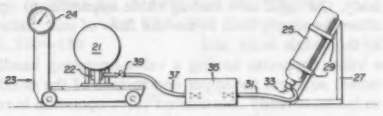
1. In a fabric-weaving apparatus, at least a pair of systems of main heddle shafts respectively carrying heddles for receiving warp yarns, a pair of drive means respectively connected operatively with said systems of main heddle shafts for operating the latter to participate in the formation of travelling-wave sheds formed by the warp yarns, each system of main heddle shafts and drive means operatively connected thereto forming in itself part of a travelling-wave loom for weaving a fabric of a given width, said systems of main heddle shafts and said pair of drive means respectively connected operatively therewith being situated adjacent but spaced slightly from each other with at least the two adjacent heddles of the two systems of main heddle shafts in line with each other, so that a given space is formed between the pair of systems of main heddle shafts, at least one additional heddle shaft situated in the latter space, and means connecting said additional heddle shaft to at least one of said main heddle shafts of one of said systems for transmitting movement from the latter one main heddle shaft to said additional heddle shaft for operating the latter for participating in the weaving of a fabric having a width greater than the sum of the widths of the fabrics woven by both of said looms.

4,053,001

METHOD FOR CHARGING A FIRE PROTECTION SYSTEM

William E. Healey; Morse R. Heineman, both of Bloomfield Hills; Ricky M. Erlich, Southfield, and James H. Remaley, Livonia, all of Mich., assignors to W. E. Healey & Associates, Inc., Bloomfield Hills, Mich.

Filed Apr. 2, 1976, Ser. No. 673,256
Int. Cl.² B65B *1/04, 3/04*
U.S. Cl. 141—2 **39 Claims**



1. A method of charging or recharging an agent storage container with a fluid fire-extinguishing agent from a supply cylinder apparatus comprising the steps of:

initially weighing the supply cylinder apparatus;

determining the mass of fluid agent which must be transferred from said apparatus to said container to establish a predetermined properly charged state at said container and the desired weight of said apparatus when said determined mass of fluid agent has been transferred from said apparatus;

transferring said fluid agent from said apparatus to said container while simultaneously monitoring the decreasing weight of said apparatus as said agent is transferred therefrom until said desired weight is attained indicating that said determined mass has been transferred to said container; and

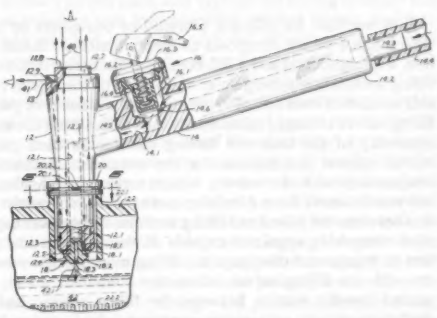
terminating the transfer of fluid agent when said desired weight is attained.

4,053,002

LIQUID DISPENSER WITH LIQUID LEVEL INDICATOR

Thomas B. Ludlow, 1515 Edgewater Ave., St. Paul, Minn. 55112

Filed Jan. 12, 1976, Ser. No. 648,267
Int. Cl.² B67C *3/02*; B65B *3/02*
U.S. Cl. 141—95 **14 Claims**



1. A liquid dispenser with a liquid level indicator for introducing liquid into a container, such as battery acid into a battery, and for indicating the level of the liquid pool into which the liquid flows, comprising:

a dispensing nozzle and having an elongated, light-transmissive body with an upper light-admitting end and a lower end alternately reflecting and dispersing the light as the lower end is respectively spaced above and immersed in the liquid pool, the upper end of the body having an upwardly facing end surface through which such reflected light may be seen, the presence or absence of reflected light at the outer end of the lighttransmissive

portion indicating to an observer the height of the liquid pool, the light-transmissive body having a central bore opening through the lower end thereof and also opening through one side thereof,

the nozzle also having an elongate rigid tube affixed to said one side of the light-transmissive body and having a liquid supply duct communicating with the open bore of the nozzle body, the elongate tube extending transversely of the nozzle body and having a length of the same order of magnitude as the length of the light-transmissive body to provide a handle for manually manipulating the nozzle body, the rigid tube having valve apparatus to open and close the supply duct to control flow of such battery acid to the nozzle body, and

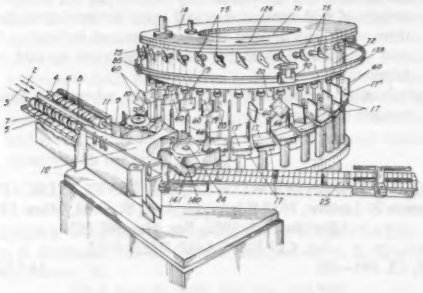
the valve apparatus having a valve-operating handle positioned adjacent the upper end surface of the nozzle body to facilitate ready coordinated valve operation in response to observations through said end surface.

4,053,003

MACHINE FOR FILLING CONTAINERS

Oscar Adolfo Ferrero, and Jorge Lorenzo Lodi, both of Buenos Aires, Argentina, assignors to The Coca-Cola Company, Atlanta, Ga.

Filed Apr. 11, 1975, Ser. No. 567,218
Claims priority, application Argentina, Apr. 15, 1974, 253295
Int. Cl.² B65B *43/52*
U.S. Cl. 141—144 **3 Claims**



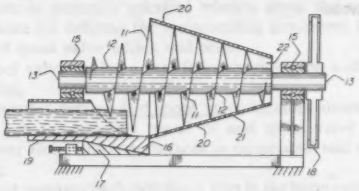
1. A machine for filling a plurality of containers by twos with a liquid which comprises an empty container infeed section, a filling section and a full container discharge section, the filling section comprising an annular tank for the liquid, rotatable around its own axis of symmetry, and a number of pairs of filling valves arranged substantially on a radius from the axis of symmetry of the tank and having underneath each pair of valves support mechanisms for the containers, rotatable in conjunction with the valves, which support mechanism receives containers from a transfer means in a first transfer section between the infeed and filling sections, the support mechanism comprising apparatus capable of changing vertical position to engage and disengage the filling mouth of the containers with the filling valves before the containers arrive at a second transfer section between the filling section and the discharge section, said empty container infeed section being equipped with an infeed spider apparatus capable of receiving and discharging empty containers by twos in a substantially radial alignment with respect to the axis of the infeed spider and with said infeed spider apparatus comprising a star mounted on a propelling axle on which a series of arms are mounted in an angularly movable manner, the arms jutting out from the periphery of the star and supporting a roller each, the rolling surface of each roller resting on a cam surface, stationary with respect to the machine, the aforesaid star apparatus having peripheral cavities which, in combination with the said arms, are capable of receiving two containers, the centers of which are substantially on a radius of the center of the aforesaid propelling axle, and of delivering them in an arrangement in which their centers are substantially on a radius of said symmetry axis whereby the containers are transferred from the empty container infeed section to the container filling section and a full bottle discharge means capable of withdrawing the filled container by twos at a second transfer section between the filling and discharge sections.

4,053,004

HELICAL HEAD COMMINUTING SHEAR

Robert D. Barwise, Bovey, Minn.; Rodger A. Arola, Hancock, Mich., and John R. Erickson, Alexandria, Va., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 12, 1975, Ser. No. 576,757
Int. Cl.² B27C *1/08*; B27L *7/00*
U.S. Cl. 144—162 R **12 Claims**



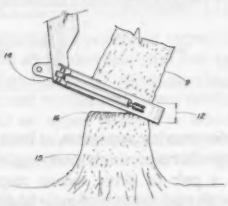
8. A cutting apparatus comprised of a helical blade mounted on a drive shaft, said blade having a radial length increasing from zero to a maximum and having an increasing pitch, said shaft rotatably mounted between bearings, an anvil mounted therebelow fitting closely at the point where the blade reaches a maximum radial length, and a means to rotate said shaft.

4,053,005

METHOD OF HARVESTING TREES

Alva Z. Albright, 2909 Monroe Highway, Pineville, La. 71360

Filed Nov. 4, 1974, Ser. No. 520,823
Int. Cl.² A01G *23/02*
U.S. Cl. 144—309 AC **1 Claim**



1. An improved method of harvesting trees comprising the steps of:

a. Engaging a tree between a pair of double-edged jaws adapted to pivotally open and close and being mounted on a power train, said double edges of each said jaw being vertically spaced apart and defining limits of cutting;

b. Cutting said tree between said jaws and within said cutting limits with a chain saw pivoting to cut on a common pivot with said jaws opening and closing;

c. Holding said tree between said jaws in original position during cutting, said double dges respectively engaging the stump and the the trunk of said tree with the cut therebetween;

d. Felling said tree trunk by tilting said jaws in a desired direction of fall, the sharp edges engaging said stump chipping free therefrom, and the sharp edges engaging said tree trunk remaining engaged therewith; and

e. Bunching said tree trunk by moving said power train and releasing said jaws and their sharp edges engaging said trunk.

4,053,006

ARRANGEMENT FOR MULTISTAGE VACUUM MOLECULAR DISTILLING

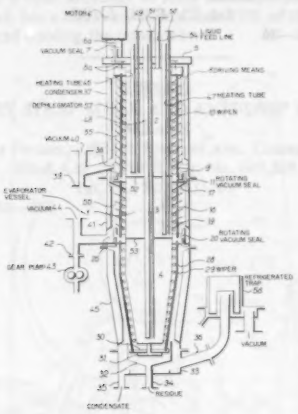
Alexander Tkac, and Jan Cvengros, both of Bratislava, Czechoslovakia, assignors to Rektorat Slovenskej vysokej skoly technickej, Bratislava, Czechoslovakia

Filed Oct. 31, 1975, Ser. No. 627,551

Claims priority, application Czechoslovakia, Apr. 10, 1974, 2573/74

Int. Cl.² B01D *1/22*

U.S. Cl. 159—6 W 6 Claims



1. In an arrangement for establishing a multi-stage vacuum and molecular distillation process using a wiped-off film, an elongated, vertically disposed evaporator vessel supported for rotation about a first longitudinal axis thereof and having a convex outer surface; means including condenser means surrounding first, second and third successively lower regions of the convex outer surface of the evaporator vessel to define therebetween first, second and third vacuum distillation stages; first and second annular elements individually affixed to the outer surface of the evaporator element to define

interfaces between the first and second vacuum stages and the second and third vacuum stages, respectively; first, second and third elongated wiping means extending longitudinally along the outer surface of the evaporator means in the respective first, second and third vacuum stages, the first, second and third wiping means respectively including first, second and third entraining rods, the first and second rods having respective lower and upper ends secured to the first annular element, the second and third rods having respective lower and upper ends secured to the second annular element, whereby the evaporator vessel, the annular elements and the entraining means form a unitary first assembly rotatable about the first axis; means disposed in each of the first and second annular elements for effecting a controlled flow of a fluid therethrough from the lower end of the next-higher vacuum stage to the upper end of the next-lower vacuum stage so that the controlled flow of such fluid during a rotation of the first assembly about the first axis provides a rotary vacuum seal between the associated vacuum stages; means for introducing a first liquid to be distilled to the upper end of the first wiping means to be entrained thereby, whereby portions of the first liquid flow downwardly and alternately through the entraining rods and the effecting means of the annular elements; means for rotating the first assembly about the first axis so that the controlled movement of the first liquid through the effecting means of the annular elements provides liquid rotary vacuum seals among the first, second and third vacuum stages; and means coupled to the condensing means for individually evacuating the first, second and third vacuum stages to successively higher degrees.

4,053,007

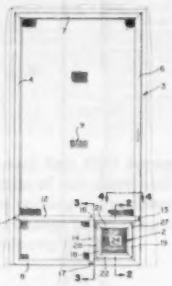
ANIMAL ACCESS DOOR FOR SCREEN DOORS

Raymond E. Griffith, 2333 Hopeton Ave., San Jose, Calif. 95122

Filed Jan. 9, 1975, Ser. No. 539,700

Int. Cl.² E06B *7/28*

U.S. Cl. 160—180 1 Claim



1. A combination animal access door and screen door for a human habitat, comprising:

a primary screen door including top and bottom transversely extending horizontal rails connected at opposite ends by first and second longitudinally extending vertical side rails, said top, bottom and side rails defining an opening covered by a screen material; and

an auxiliary screen door assembly in said primary screen door and comprising an elongated transversely extending horizontal top mounting rail having opposite ends attached to said first and second side rails of said primary screen door intermediate said top and bottom rails, a vertical rail disposed intermediate said side rails of said primary screen door, said vertical rail having its upper end attached to said top mounting rail and having its lower end attached to said bottom rail of said primary screen door, said top rail and said vertical rail cooperating with portions of said first side rail and said bottom rail of said primary screen door to define an animal access opening in said primary screen door, an animal access door comprising a generally quadrilateral frame covered by a screen material, pivot means for mounting said access door in said access opening, said pivot means comprising rod means mounted at the top of said quadrilateral frame and journalled in said vertical rail and said first side rails to define a horizontal pivot axis for said access door, whereby said access door normally is suspended from said pivot means in the plane of said primary screen door to close said access opening, said pivot means permitting pivotal motion of said access door out of its normal plane in opposite directions to permit the passage of an animal therethrough in either direction.

4,053,008

SUPPORT MOLDING FOR FABRIC WALL COVERINGS

Floyd M. Baslow, 100 Lafayette St., New Bethlehem, Pa. 16242

Division of Ser. No. 680,703, April 27, 1976, Pat. No. 4,018,260.

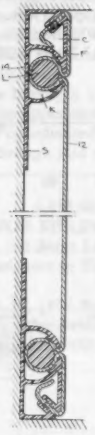
This application Sept. 30, 1976, Ser. No. 728,285

Int. Cl.² A47H *23/00, 13/00*

U.S. Cl. 160—327 13 Claims

1. An assembly of border pieces for creating a framework

attachable to a wall or other flat surface for mounting a fabric sheet which is cut to dimensions at least sufficient to cover the surface, said assembly comprising linear border pieces and right-angle corner border pieces, the linear pieces being abutted in end-to-end relation with the corner pieces to define a framework whose outer edge follows the perimeter of the area to be covered, each piece of said framework including a raised face, a storage channel having a narrow inlet running adjacent the outer edge of the piece and communicating with said face,



and a keyway extending in parallel relation to the storage channel and having an inlet communicating with said face, whereby a zone along the selvage of the fabric sheet is trapped within the keyway and the remaining tail of the selvage which includes fabric material in excess of that necessary to cover said surface is stuffed within the channel so that the exposed selvage of the sheet which lies against said face presents a smooth appearance which extends to the inlet of the storage channel and is directly adjacent said perimeter.

4,053,009

SUSPENSION AND HEADING STIFFENER FOR CURTAINS, DRAPES OR THE LIKE

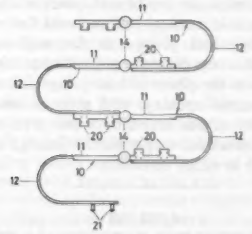
William Joel Reginald Edlin, P.O. Box 90, Katikati, New Zealand

Filed Apr. 2, 1976, Ser. No. 673,133

Claims priority, application New Zealand, Apr. 7, 1975, 177140

Int. Cl.[2] A47H *13/14*

U.S. Cl. 160—348 **6 Claims**



1. A combination suspension and heading stiffener for a drape, curtain or like article comprising: an elongate member of substantially uniform width throughout its length and having one end portion thicker than the other end portion so that said one end portion is substantially rigid whereas said other end portion is flexible; means disposed at a longitudinal edge portion of said elongate member for suspending it during use from suspension guide means; and means at one end of said elongate member for connecting with cooperating means at the other end of another similar elongate member to enable connection together of a plurality of such elongate members in end to end relationship.

4,053,010

PROCESS AND APPARATUS FOR THE CONTINUOUS CASTING OF METAL PRODUCTS

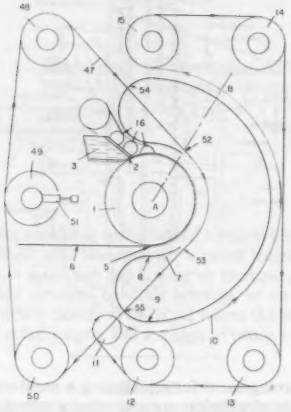
Raymond Boccon-Gibod, Paris, France, assignor to Societe de vente de l'Aluminium Pechiney, Paris, France

Filed June 21, 1976, Ser. No. 698,183

Claims priority, application France, July 8, 1975, 75.22021; July 23, 1975, 75.24452

Int. Cl.[2] B22D *11/06*

U.S. Cl. 164—86 **25 Claims**



1. A process for the continuous casting of products of metal alloys such as strips, sheets, bars, blanks for wire rods, ingots and special products, comprising the casting of liquid metal between two surfaces, at least one of which is convex, applying a high pressure to the metal during solidification via these surfaces, the final thickness of the product may be appreciably reduced with respect to the initial thickness presented to the liquid metal, and keeping the cast product on the sides during its reduction in thickness by means of cooled tilting or retracting lateral sectors, the casting of liquid metal between two surfaces involving feeding the liquid metal near the upper generatrix of a cooled rotating casting drum, applying a series of shutters, which are also cooled and are almost joined, around the effective part of the drum and turning the series of shutters at the same rate as the drum, exerting a high pressure on the metal throughout the solidification via the shutters, the pressure of the shutters on the metal being exerted via one or more endless chains or cables acting on the side of the shutters opposite the cast metal and forcibly urging the shutters against the cast metal, and turning at a velocity synchronized with that of the drum, releasing the shutters from the action of the cables or chains, in the vicinity of the outlet for the cast product, the said shutters falling under their own weight, guiding the shutters by a rolling pathway, and moving and raising the shutters by belts to the vicinity of the liquid metal feed point where drive rollers bring them into a quasi-joined arrangement, spacing members being disposed on the said shutters, cooling of the shutters by circulating cooling fluid from the casting drum, and effecting an alignment of connection openings of the cooling fluid circuits of the drum and the shutters around the effective part of the drum by the spacing members of the shutters.

4,053,011

PROCESS FOR REINFORCING ALUMINUM ALLOY

Paul Gordon Riewald; William Henry Krueger, and Ashok Kumar Dhingra, all of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 615,356, Sept. 22, 1975, Pat. No. 4,012,204, which is a continuation-in-part of Ser. No. 522,881, Nov. 11, 1974, abandoned. This application Sept. 17, 1976, Ser. No. 724,249
Int. Cl.² B22D *19/02*
U.S. Cl. 164—97 11 Claims

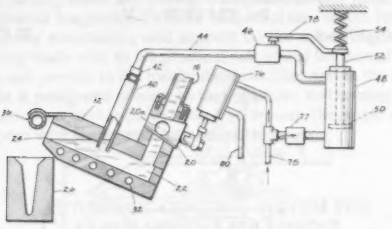
1. A process comprising the steps of placing polycrystalline alumina fibers in a mold, forming a composite reinforced with 10–80 volume percent of said fibers and having a porosity of less than about 10% by infiltrating the fibers in the mold with a molten aluminum alloy containing about 1–8% by weight of lithium for a time sufficient to form a reaction sheath on the fibers which has a thickness of less than 15% of the total fiber diameter and cooling the composite.

4,053,012

BATTERY STRAP MOLD AND ANTI-DRIP POURING MEANS

John Edgar Farmer, 12034 S. Emerald Ave., Chicago, Ill. 60628

Filed Aug. 25, 1975, Ser. No. 607,288
Int. Cl.² B22D *35/04*
U.S. Cl. 164—254 7 Claims



1. An apparatus for delivering molten metal to a mold cavity which comprises a molten metal delivery head including an upwardly inclined molten metal reservoir terminating in a nozzle mouth with a lower lip for pouring molten metal from the reservoir into the mold cavity, means for supplying molten metal to said reservoir, valve means movable between open and closed positions for controlling delivery of molten metal into said reservoir and through said nozzle providing intermittent delivery from the nozzle for intermittent pours into the mold cavity and suction means including a fluid tap extending below the nozzle lower lip and into direct fluid communication with said reservoir and containing a fluid for direct surface contact with molten metal in the reservoir for withdrawing molten metal from the reservoir by said suction means communicating with said tap to apply suction upon said fluid in said tap at the end of each pour so as to prevent dripping of molten metal from the end of the nozzle between pours.

4,053,013

MULTI-PURPOSE APPARATUS FOR HEATING OR COOLING FLUIDS

Peter Guba, 786 Malibu Lane, Indialantic, Fla. 32903

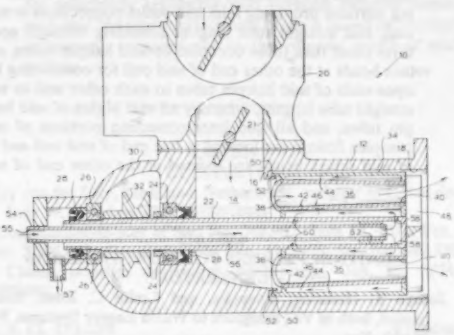
Filed May 6, 1975, Ser. No. 574,917
Int. Cl.² F28D *11/02*
U.S. Cl. 165—86 22 Claims

1. Apparatus for heating or cooling a first fluid comprising:

a housing having a chamber, said housing having an inlet and an outlet therethrough with a flow path for said first fluid defined therebetween, said inlet communicating between said chamber and a source of said first fluid;

a rotor rotatably positioned within said chamber, said rotor having at least one tubular member defining a passageway extending within said rotor and in said flow path between said inlet and said outlet;

means for rotating said rotor such that said tubular member communicates between said inlet and said outlet constantly during each cycle of rotation such that there is a



constant flow of said first fluid between the inlet and outlet during rotation of said rotor; and

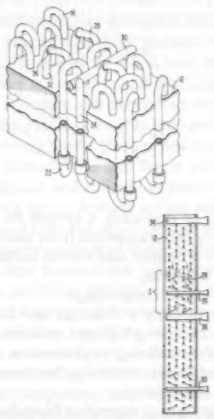
means for heating or cooling the periphery of said tubular member to effect a change in the temperature of said first fluid passing therethrough.

4,053,014

FINNED TUBE COIL

Edward C. Neff, Norman, and Howard F. Spicer, Oklahoma City, both of Okla., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 23, 1975, Ser. No. 580,506
Int. Cl.² F28F *1/18, 1/32*
U.S. Cl. 165—150 2 Claims



1. A multi-row, finned tube coil having opposite ends, comprising:

a number of apertured fins stacked and spaced apart in parallel relation between the opposite ends of the coil, the apertures in said fins being in aligned relation;

a number of aluminum hairpin tubes, each having a bight portion and two leg portions, said leg portions extending through said apertures in a direction locating all of said bight portions at one end of said coil;

at least some of said hairpin tubes being oriented, relative to the planes of the rows of the tubes, to interconnect at least some of the rows of tubes at selective locations at said one end;

a number of complex fittings including interconnecting portions and straight tube length portions, all of said interconnecting portions being located at said one end of said coil some of said interconnecting portions furthering the interconnection of at least some of the rows of tubes at other selective locations, and others of said interconnecting portions providing inlet and outlet connections to said coil, said straight tube lengths extending through apertures other than those occupied by said hairpin tubes; and

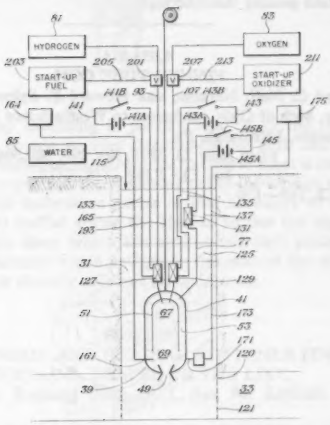
return bends at the other end of said coil for connecting the open ends of said hairpin tubes to each other and to said straight tube lengths, whereby all said bights of said hairpin tubes, and all said interconnecting portions of said complex fittings are located at one end of said coil and all of said return bends are located at the other end of said coil.

4,053,015

IGNITION PROCESS FOR DOWNHOLE GAS GENERATOR

Joseph T. Hamrick, Roanoke, and Leslie C. Rose, Rocky Mount, both of Va., assignors to World Energy Systems, Fort Worth, Tex.

Filed Aug. 16, 1976, Ser. No. 714,787
Int. Cl.² E21B *43/24*
U.S. Cl. 166—302 **5 Claims**



1. A process of operating a system for use for recovering hydrocarbons or other materials from underground formations penetrated by a borehole, said system including a gas generator located in the borehole,

said gas generator comprising:

a housing forming a chamber and having an upper inlet end for receiving fuel and an oxidizing fluid,

said chamber defining a combustion zone, and

a restricted lower outlet for the passage of heated gases,

said system comprising:

fuel conduit means extending from the surface to said inlet end for supplying fuel from the surface into said chamber,

oxidizing fluid conduit means extending from the surface to said inlet end for supplying oxidizing fluid into said chamber,

first valve means located in the borehole near said gas generator and coupled to said fuel conduit means,

second valve means located in the borehole near said gas generator and coupled to said oxidizing fluid conduit means, and

control means located at the surface for controlling said first and second valve means,

said process comprising the steps of:

while said first valve means is closed injecting a given fuel into said fuel fuel conduit means for flow to the level of said first valve means,

while said second valve means is closed injecting a given oxidizing fluid into said oxidizing fluid conduit means for flow to the level of said second valve means,

said given fuel being characterized such that it ignites spontaneously when exposed to said given oxidizing fluid,

injecting a second fuel into said fuel conduit means behind said given fuel,

operating said control means to open said first and second valve means for allowing said given fuel and said given oxidizing fluid to flow into said chamber for ignition of said given fuel, and

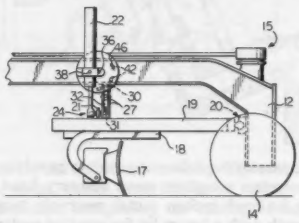
flowing said second fuel and an oxidizing fluid into said chamber to form a combustible mixture which is ignited by the ignition of said given fuel.

4,053,016

MOTOR GRADER BLADE LIFT AND CONTROL MECHANISM AND METHOD

Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 7, 1976, Ser. No. 720,859
Int. Cl.² E02F *3/76*
U.S. Cl. 172—1 **22 Claims**



1. A motor grader comprising

a forwardly extending main frame,

a sub-frame pivotally attached to said main frame,

a normally horizontally disposed blade attached to said sub-frame,

lifting means, including a pair of extensible and retractable actuating means disposed on either side of said main frame, connecting said sub-frame to said main frame for swinging said blade from its normal horizontal position to a generally vertical position on either side of said main frame, and

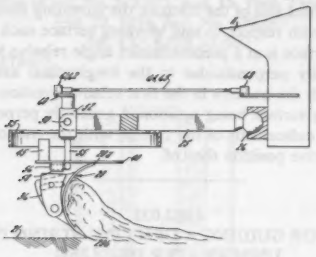
indexing means rotatably mounted about an axis thereof on each lateral side of said main frame and wherein a respective one of said actuating means is pivotally connected to said indexing means in offset relationship relative to the rotational axis thereof for selectively raising or lowering said actuating means vertically relative to said main frame.

18. A method for moving and simultaneously indexing a blade which is suspended under a frame of a construction vehicle by at least one double-acting cylinder interconnected between a disc rotatably mounted on said frame and said blade comprising the steps of rotating said disc to a selected rotative and indexed position on said frame while simultaneously moving said cylinder in a vertical plane disposed at least substantially parallel relative to a longitudinal axis of the frame of said vehicle.

4,053,017
CROSS SLOPE CONTACT SYSTEM FOR SURFACE FINISHING MACHINES

Raymond E. Gill, Clearwater, Fla., and Floyd McMahon, Peoria, Ill., assignors to Westinghouse Air Brake Company, Pittsburgh, Pa.

Filed Nov. 7, 1975, Ser. No. 629,897
Int. Cl.[2] E02F 3/76
U.S. Cl. 172—4.5 10 Claims

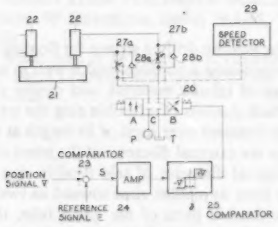


1. Apparatus for sensing the cross slope of a surface finishing machine cutting blade which is selectively positionable about a universal drawbar pivot point and which is rotatable with respect to its supportive drawbar about a substantially vertical axis, comprising a support positionable on the upper edge of said cutting blade and having a longitudinal axis parallel to a horizontal longitudinal axis of said machine, means for automatically maintaining said support on the upper edge of said cutting blade with its longitudinal axis in said horizontal condition and parallel to the longitudinal machine axis as the cutting blade is positioned relative to said machine, and sensing means mounted on said support table for sensing the angle of said support with respect to the horizontal.

4,053,018
AUTOMATIC CONTROL SYSTEM FOR EARTH-MOVING EQUIPMENT

Tashiro Takeda, Kanagawa, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Division of Ser. No. 472,279, May 22, 1974, Pat. No. 3,957,121. This application Jan. 30, 1976, Ser. No. 653,787
Claims priority, application Japan, May 23, 1973, 48-59521; May 29, 1973, 48-63079[U]
Int. Cl.[2] E02F 3/76
U.S. Cl. 172—4.5 4 Claims

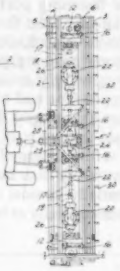


1. An automatic control system disposed in earthmoving equipment comprising:
- an earth-moving vehicle having an earth-moving blade coupled thereto;
- a pressure cylinder means coupled to said blade for raising and lowering the cutting depth thereof;
- a switching valve coupled to said pressure cylinder means for selectively activating said cylinder means;
- a first comparator means coupled to said switching valve, said comparator means for comparing the actual blade depth with a predetermined depth and for selectively activating said switching valve thereby causing said blade depth to readjust into said predetermined depth; and
- a speed detector coupled to said cylinder means, said detector for determining the running speed of said vehicle and for selectively regulating said pressure cylinder means such that the rate at which said blade is raised or lowered is inversely proportional to the running speed of said vehicle.

4,053,019
CULTIVATOR

Ary van der Lely, Maasland, Netherlands, assignor to C. van der Lely N. V., Maasland, Netherlands

Continuation-in-part of Ser. No. 369,907, June 14, 1973, Pat. No. 3,885,633. This application Jan. 13, 1975, Ser. No. 540,328
Claims priority, application Netherlands, Jan. 18, 1974, 7400686
Int. Cl.[2] A01B 33/06
U.S. Cl. 172—59 6 Claims



1. A cultivator comprising an elongated supporting structure that has at least two substantially parallel beams extending transverse to the direction of travel, at least one hollow frame portion with a group of rotatable soil working members being connected to said structure and depending from the same, said soil working members being rotatably mounted on corresponding upwardly extending shafts that are positioned in a row and said shafts being journalled in said frame portion, said frame portion being elongated and extending transverse to the direction of travel, drive means housed within said frame portion and engaging said shafts, the shaft one of said soil working members having an extension that is connected to a first drive transmission, said first transmission being mounted on top of said frame portion and being interconnected to a second drive transmission on said supporting structure by a detachable drive shaft, said frame portion, together with said group of soil working members, and said first transmission being detachably connected to said supporting structure and drive shaft respectively, spaced apart supporting members detachably mounted on said hollow frame portion and said supporting members forming part of a parallelogram linkage that interconnects the frame portion to said supporting structure, said linkage comprising two spaced apart arms positioned one above the other that are pivotable upwardly and downwardly, the forward ends of said arms being connected to bracket means on said leading beam and the rearward ends of the arms being pivoted to said support members, said drive shaft and support members being detachable from said first transmission and frame portion and reconnectable to a further transmission and a further hollow frame portion that has corresponding soil working members, said corresponding soil working members having a working width that differs from the first mentioned group of soil working members.

4,053,020

SOIL WORKING TINES

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Feb. 6, 1975, Ser. No. 547,726
Claims priority, application Netherlands, Feb. 8, 1974, 7401725
Int. Cl.[2] A01B 23/02
U.S. Cl. 172—713 13 Claims

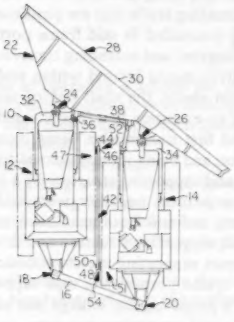
1. An elongated tine for a rotary harrow comprising a substantially straight upper fastening portion and a substantially straight lower soil working portion that terminates in a lower tip, said fastening portion having a lower first tapering part and an adjoining upper second tapering part, each of said parts tapering inwardly and upwardly towards a screw threaded portion located at an upper free end of the fastening portion, said first part adjoining an integral junction with said soil working portion and said second part being located between said first part and said screw threaded portion, said first part more steeply tapering inwardly than said second part and each said part having substantially conical configuration, said second part extending for substantially at least half of the length of said fastening portion.

4,053,021

SIDE-BY-SIDE TRACTOR COMBINATION

James R. Sturges, Washington, and Willis R. Daft, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 8, 1976, Ser. No. 675,027
Int. Cl.[2] E02F 3/76
U.S. Cl. 172—801 4 Claims



1. A multi-tractor assembly comprising first and second tractors in generally side-by-side and parallel relation, a first coupler element interconnecting the respective rearward ends of the tractors through pivotal joints, a second coupler element comprising a working implement comprising a blade defining a working surface, mounting means for pivotally mounting the second coupler element to the respective forward end of the tractors, and fixed length rigid link means connectable to said first and second tractors to be coupled to one of said tractors at a point forwardly of the coupling to the other tractor to determine with said first and second coupler elements a first relative position of the first and second tractors with the first tractor forward of the second tractor to in turn determine a first position of the working implement relative to the longitudinal axis of the tractors, and said rigid link also being connectable to said first and second tractors to be coupled to the other of said tractors at a point forwardly of the coupling to the one tractor to determine with said first and second coupler elements a second relative position of the first and second tractors with the second tractor forward of the first tractor to in turn determine a second position of the working implement relative to the longitudinal axis of the tractors, the mounting means being positioned with respect to said working surface such that the working surface is at a predetermined angle relative to a position generally perpendicular to the longitudinal axis of the tractors with the tractors in the first relative position thereof, the working surface being positioned generally perpendicular to the longitudinal axis of the tractor with the tractors in the second relative position thereof.

4,053,022

DEVICE FOR GUIDING A DRILLING STRING DURING UNDERWATER DRILLING

Georges Mercier, Boulogne, France, assignor to Entreprise de Recherches et d'Activites Petrolieres (E.R.A.P.), Paris, France

Filed June 25, 1975, Ser. No. 590,100
Claims priority, application France, June 26, 1974, 74.22257
Int. Cl.[2] E21B 7/12
U.S. Cl. 175—5 13 Claims

1. Device for guiding drilling strings for floating installations of the type comprising a platform and a well in said platform for the passage of tubular material, said device comprising a guide tube which consists of a flexible ring the internal diameter of which is constant over most of its length at a value from 1.1 to 1.4 times the external diameter of the joints of the drilling string, the external diameter of said flexible ring diminishing progressively from its median zone toward its two ends which constitute the flexible parts of the guide tube, the minimum thickness of said flexible ring being at least 4 mm, and the ratio of the thickness of the median zone of the guide tube to said minimum thickness lying between 4 and 25, while the ratio of the thickness in the median zone to the total length L of the tube varies from 0.002 to 0.010, a swivel joint connecting the median zone of said guide tube through lateral connecting means to the wall of said well, said swivel joint having an internal part contacting the outside of the ring and defining a spherical surface engaged in an external part, said external part being connected to the platform by means of longitudinal connecting means.

4,053,023

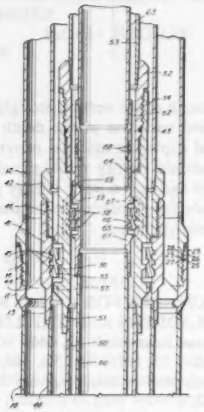
UNDERWATER WELL COMPLETION METHOD AND APPARATUS

David P. Herd, Houston, Tex., and John H. Fowler, Pittsburgh, Pa., assignors to McEvoy Oilfield Equipment Co., Houston, Tex.

Division of Ser. No. 387,667, Aug. 13, 1973, which is a division of Ser. No. 103,839, Jan. 4, 1971, which is a continuation of Ser. No. 792,912, Jan. 22, 1969, which is a continuation-in-part of Ser. No. 728,081, May 9, 1968, Pat. No. 3,442,536, which is a continuation of Ser. No. 572,511, Aug. 15, 1966. This application Aug. 22, 1974, Ser. No. 499,467

Int. Cl.[2] E21B *33/035*

U.S. Cl. 175—7 9 Claims



1. A method of installing a string of pipe in the earth, comprising the steps of:

axially inserting a first pipe into a second pipe while preventing relative rotation therebetween until further insertion of said first pipe into said second pipe is prevented by a stop,

rotating said first pipe within said second pipe less than one revolution until tooth-like projections on said first pipe engage tooth-like projections on said second pipe,

driving the pipes into the earth.

4,053,024

LIGHT ITEM PORTABLE SCALE

Myron S. Hoyt, 98 Hawthorne Drive, N.1-M, New London, Conn. 06320

Filed Aug. 3, 1976, Ser. No. 711,393

Int. Cl.[2] G01G *3/00, 21/00, 19/56*

U.S. Cl. 177—225 5 Claims

1. A portable scale for weighing light items comprising:

a substantially planar flexible strip of material having a proximate end and a distal end,

a scale adjacent said proximate end calibrated in units of weight,

a horizontal slot adjacent said distal end for receiving the proximate end of said strip bent back upon itself therethrough including said scale; and

means connected to the distal end of said strip for retaining an item to be weighed,

whereby the distal end of said strip can move under the weight of said item relative to said proximate end and said scale to indicate on said scale the weight of said item.

4,053,025

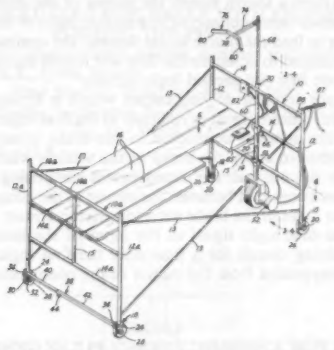
SCAFFOLD INCLUDING REVERSIBLE AND ADJUSTABLE DRIVING AND STEERING UNIT

John A. Slusarenko, 6724 Coleman Creek Road, Medford, Oreg. 97501

Filed July 14, 1976, Ser. No. 705,052

Int. Cl.[2] B60K *7/00*

U.S. Cl. 180—2 R 8 Claims



1. A scaffold including, in combinaton, a steering and driving unit which scaffold has a front end frame member that includes roller supported corner posts, cross-bars that connect the corner posts, and a vertical intermediate steering and driving bar, and said unit having, in combination,

a. a drive wheel,

b. a wheel and motor supporting frame on which the drive wheel is revolably mounted,

c. carrying means for the motor supporting frame adapted for attachment to an end frame member of the scaffold,

d. a reversible, variable speed wheel driving motor carried by said motor supporting frame,

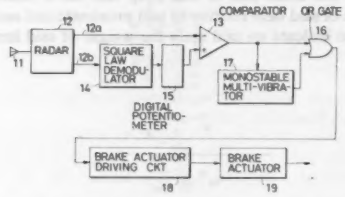
e. driving connections between the motor and the drive wheel, and

f. steering means at the forward end of the scaffold conveniently accessible to an occupant of the scaffold for controlling the direction in which the drive wheel points, the drive wheel frame being carried by a drive wheel stem having supporting plural prong hangers which hang on cross-bars of the scaffold end frame member and embrace a vertial bar thereof.

4,053,026
LOGIC CIRCUIT FOR AN AUTOMATIC BRAKING SYSTEM FOR A MOTOR VEHICLE

Norio Fujiki, Yokohama, and Hiroshi Endo, Yokosuka, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 8, 1976, Ser. No. 748,701
Claims priority, application Japan, Dec. 9, 1975, 50-147248
Int. Cl.[2] B60T 7/00; G01S 9/02
U.S. Cl. 180—98 5 Claims



1. In an automatic braking system for a motor vehicle having a brake for braking the vehicle which is applicable by the automatic braking system;

an antenna for transmitting and receiving a radar signal;

a radar operatively connected to the antenna;

a comparator a first input of which is connected to a first output of the radar to receive a first signal therefrom;

a square law demodulator the input of which is connected to the second output of the radar to receive a second signal therefrom;

a digital potentiometer connected to the square law demodulator to receive a third signal therefrom and arranged to increase the magnitude of the third signal by a coefficient to form a fourth signal, the output of the digital potentiometer being connected to a second input of the comparator to feed the fourth signal thereto, the comparator being arranged to compare the first and fourth signals and generate first and second logic signals;

a brake actuator driving circuit which is arranged to produce a drive signal in response to the first logic signal; and

a brake actuator connected to the brake actuator driving circuit to apply the brake of the vehicle when receiving the drive signal; the improvement comprising

means connected between the output of the comparator and the input of the brake actuator driving circuit which adds the first logic signal to the input of the brake actuator driving circuit for a time after the first logic signal has disappeared from the output of the comparator.

4,053,027
USE FOR A SEISMIC ENERGY PULSE GENERATOR FOR GENERATING AND SHAPING A SEISMIC ENERGY PULSE

Oswald A. Itria, Bellaire, Tex., assignor to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 411,598, Oct. 30, 1973, abandoned, which is a continuation-in-part of Ser. No. 239,530, March 30, 1972, abandoned. This application Mar. 5, 1975, Ser. No. 555,462
The portion of the term of this patent subsequent to Sept. 30, 1992, has been disclaimed.
Int. Cl.[2] G01V 1/06, 1/38
U.S. Cl. 181—118 6 Claims

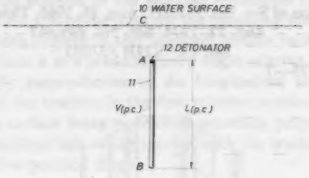
1. A new use for a known seismic generator for generating a particular shaped single seismic energy pulse for delineation of sedimentary section below the surface of a body of water comprising,

a. forming a vertical straight explosive material of a predetermined length,

b. positioning the vertical straight explosive material at a predetermined substantial depth below the surface of the water,

c. generating a single compressional first portion of said seismic energy pulse of a predetermined precise length downwardly to the lower end of the vertical straight explosive material, and

d. generating a single rarefactional aft portion of said seismic energy pulse of a second predetermined precise length first upwardly to the surface and then downwardly to the position of the lower end of the vertical straight explosive material,

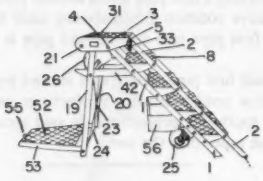


variation in the length of the vertical straight integral explosive material and variation in the depth of the vertical straight integral explosive material provides variation in both of said seismic energy pulse signal compressional forward portion and said seismic energy pulse signal rarefactional aft portion to predetermine the shaping of the single seismic energy pulse.

4,053,028
APPARATUS SUITABLE FOR USE AS STAIRWAYS, STEPLADDERS AND THE LIKE

Gilbert Loix, Chaussee Brunehault 22, 4462 Wihogne, Belgium

Filed May 25, 1976, Ser. No. 689,823
Claims priority, application Belgium, May 26, 1975, 829490; Apr. 15, 1976, 0166178
Int. Cl.[2] E06C 1/393, 1/397
U.S. Cl. 182—1 8 Claims



1. Apparatus for use as stairs, steps and the like, comprising;

lower and upper pairs of parallel rectilinear stringers, each stringer of the lower pair being disposed below and parallel to the respective stringer of the upper pair;

a pair of horizontal, parallel arms whereto first ends of the stringers are articulated about respective arms pivot axes extending between the arms, one of said axes supporting the lower stringers and being spaced downwardly from another one of the arm pivot axes, said other one supporting the upper stringers;

a plurality of treads mounted on and between the stringers, each tread having lower tread pivot means connecting it to the lower stringers at and about a lower tread pivot axis, and each tread having upper tread pivot means connecting it to the upper stringers at and about an upper tread pivot axis, the tread pivot axes being spaced apart longitudinally of the stringers by distances approximately equal to the widths of the treads and

being spaced apart vertically by a distance approximately equal to said predetermined vertical distance between the arm pivot axes; and

two elongate support elements articulated between the hori-

zontal arms, each such element having a post perpendicular thereto and having post pivot means pivoted to one of the horizontal arms so that the support elements can be turned from a support position below the horizontal arms to a rest position above the horizontal arms; whereby the stringers and the support elements can be turned relative to the horizontal arms, while the treads are and remain horizontal.

4,053,029

SPRING DRIVE MECHANISM, PARTICULARLY FOR MOBILE TOYS

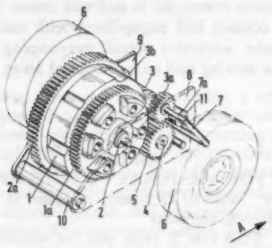
Helmut Darda, Im Tal, D-7712 Blumberg, Germany

Filed Dec. 18, 1975, Ser. No. 642,172

Claims priority, application Germany, Dec. 24, 1974, 2461456; Dec. 27, 1974, 2461625

Int. Cl.² F03G *1/00*

U.S. Cl. 185—39 **18 Claims**



1. In a spring drive mechanism, particularly for toy vehicles; a drive spring; a plurality of gear wheels of different diameters being arranged on an axle, said drive spring having the ends thereof connected to said gear wheels; a drive and spring wind-up shaft located in parallel with said axle; two pinions having different diameters being located on said shaft; directional escapement means having oppositely effective rotational directions adapted to interconnect said pinions with said gear wheels, the smaller diameter pinion being in engagement with the spring gear wheel having the larger diameter and the larger diameter pinion being in engagement with the spring gear wheel having the smaller diameter; a reversing pinion having two gear tooth rims, one said gear tooth rim being in constant engagement with the first of said pinions, the other said gear tooth rim adapted to be brought into operative connection with the spring gear wheel which is not in engagement with said first pinion; spring drive mechanism plates for supporting the axle of said reversing pinion; a bearing support formed as an elongate aperture for producing the drive connection; and a spring being acted upon by the portion of the axle of said reversing pinion for disengagement of the drive connection, the improvement comprising: said reversing pinion axle being a portion of a spring wire retained in said plates, a part of said spring wire located on the side of said elongate aperture being a support member for effecting displacement of the reversing pinion axle so as to provide said drive connection.

4,053,030

PISTON SEAL AND RETURN SPRING

Dean R. Bainard, Clover, S.C., and Martin E. Benjamin, Gastonia, N.C., assignors to Garlock Inc., Rochester, N.Y.

Filed Sept. 7, 1976, Ser. No. 720,696

Int. Cl.² F16D *65/54*

U.S. Cl. 188—71.8 **16 Claims**

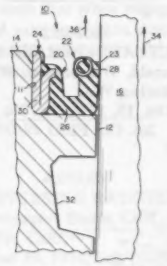
1. An annular piston seal and return spring for a disc brake piston/caliper assembly comprising:

a. an annular elastomeric body having a sealing lip portion including a sealing lip, a seal retaining portion spaced radially outwardly from said sealing lip portion, and an intermediate flex portion extending between said sealing lip portion and said seal retaining portion,

b. a first reinforcing element incorporated in said sealing lip portion,

c. a second reinforcing element incorporated in said seal retaining portion, and

d. said sealing lip portion being axially moveable, with respect to said seal retaining portion, from its rest position to an extended position by the flexing of said flex portion, and said flex portion exerting a retracting force on said sealing lip portion when in its extended position tending to retract said sealing lip portion back to said rest position, whereby said sealing lip portion can move axially with a piston sealed thereby and can both seal and retract said piston.



4,053,031

PISTON ACTUATED DISC BRAKE WITH MEANS FOR PUSHING THE PISTON

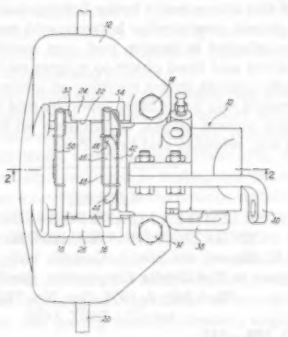
Alain Thioux, Chennevieres, France, assignor to Societe Anonyme D.B.A., Paris, France

Filed Nov. 17, 1976, Ser. No. 742,960

Claims priority, application France, Dec. 3, 1975, 75.36946

Int. Cl.² F16D *55/02*

U.S. Cl. 188—71.9 **8 Claims**



1. A disc brake comprising brake applying means associated with a carrying member so as to urge two friction pads towards the respective faces of a rotary disc, the brake applying means comprising at least one piston mounted in a cylinder and movable towards the disc from an idle position to urge one of the pads towards the corresponding face of the disc when the brake is operated, the carrying member comprising an aperture defining two circumferentially spaced edges, each of which comprises at least one sliding surface with which the one pad cooperates in accordance with the wear on its lining, at least one of the edges also comprising a slot offset towards the piston relative to the corresponding sliding surface, means being provided to push the piston back away from the disc

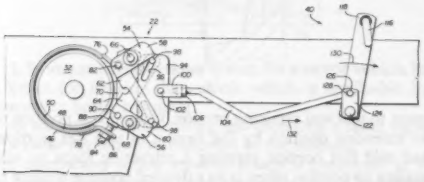
towards said idle position, so that the pad can be brought opposite the slot, whose dimensions permit radial extraction of the pad through the aperture, wherein automatic adjusting means are associated with the piston, the means for pushing back the piston in opposition to the adjusting means being operated by introduction of a tool between the one pad and the piston after removal of a wedge forming element normally inserted therebetween.

4,053,032

SELF-ACTUATING BRAKE LINKAGE

Raymond F. McDonald, Winneconne, Wis., assignor to J. I. Case Company, Racine, Wis.

Filed Oct. 15, 1976, Ser. No. 732,677
Int. Cl.² F16D *49/00*
U.S. Cl. 188—77 R **10 Claims**



1. An improved self-actuating brake for vehicles, including a flexible brake band having a center portion for receipt around a rotatable drum, a pair of brake actuating levers, each of said levers having a first pivotal connection to one of said brake band free ends, a fixed pivot adjacent said first pivotal connection and a second pivotal connection to a cam member, said first pivotal connection and said fixed pivot defining the shorter leg of an L-shaped lever with said first and second pivotal connections defining the longer legs, said longer legs of said lever extending away from said brake band and crossing, said cam member located generally between said second pivotal connections of said levers, said cam member having a pair of angularly related slots extending generally away from said brake band and slidably receiving said second pivotal connections of said levers and a brake linkage means pivotally connected to said cam member between said second pivotal connections adapted to tension said cam member, rotating said levers about said fixed pivots to actuate said brake, release of said brake linkage means resulting in movement of said cam plate toward said brake band, whereby said cam plate spreads said lever second pivotal connections within said angularly related slot, releasing said brake band.

4,053,033

PRESSURE LIMITER MEANS FOR CONTROLLING THE OPERATION OF A SOLENOID VALVE

Albert E. Sisson, and Henry Dorsett, both of LaPorte, Ind., assignors to The Bendix Corporation, South Bend, Ind.

Filed July 1, 1976, Ser. No. 701,827
Int. Cl.² B60T *7/20*
U.S. Cl. 188—112 **6 Claims**

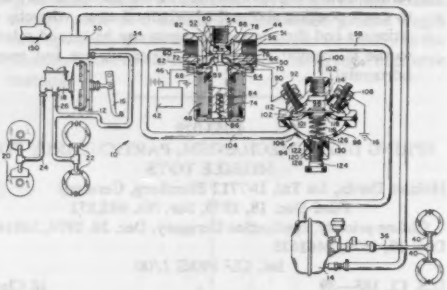
1. In combination with a solenoid valve, a sway sensor and a servomotor, switch means for limiting the communication of a brake activation signal from said solenoid valve which operates said servomotor in response to a sway control signal developed in said sway sensor, said switch means comprising:

a housing having a cavity therein;

wall means located in said cavity, said cavity being adapted to receive said brake activation signal;

a first contact connected to said solenoid valve;

a second contact attached to said wall means for connecting said first contact with an electrical ground to allow said sway signal to energize said solenoid valve and produce said brake activation signal, said wall means responding to a predetermined brake activation signal by moving said second contact away from said first contact to interrupt the energization of said solenoid valve and thereby modulate the development of said brake activation signal; and



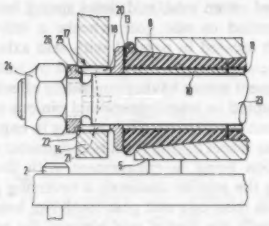
resilient means connected in said wall means for urging said second contact into engagement with said first contact, said brake activation signal overcoming said resilient means in moving said second contact away from said first contact.

4,053,034

MOUNT FOR A RAILWAY VEHICLE DISC BRAKE

Ernst Katzer, Munich, Germany, assignor to Knorr-Bremse GmbH, Munich, Germany

Filed Feb. 5, 1976, Ser. No. 655,566
Claims priority, application Germany, Feb. 5, 1975, 2504804
Int. Cl.² F16D *65/14*; F16C *27/06*
U.S. Cl. 188—206 R **3 Claims**



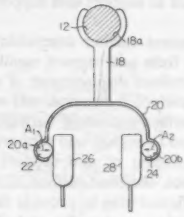
1. In a disc brake for a railway vehicle, a resilient pivot mount for a cross member upon the ends of which are pivotally mounted brake levers having brake shoes thereon engageable with a brake disc on one of the wheel or axle of the railway vehicle, comprising a pair of spaced trunion bearings mounted on the frame of the vehicle, a bushing attached to the cross piece, said bushing having a bore therethrough, a pair of compressible rubber sleeves inserted into said bushing from each end thereof, each of said rubber sleeves having a cylindrical bore therethrough and an external annular flange on the outer end thereof, a threaded bolt passing through said trunion bearings and rubber sleeves to support said bushing and cross piece from the frame, a pair of clamping sleeves each having a cylindrical portion in each trunion bearing and a flange at one end of said cylindrical portion engageable with the outer flange end of respective rubber sleeves, said cylindrical portion having an outer end and a plurality of axial slots extending from said outer end substantially the length of said cylindrical portion away from said flange, said outer end having an inwardly beveled surface engageable with correspondingly shaped surfaces on fastener means on said bolt, the tightening of said fastener means on said bolt spreading apart the slotted portions of said cylindrical portion against said trunion bearing.

4,053,035

CURRENT COLLECTING SYSTEM FOR SELF-PROPELLED CARRIAGE OF AERIAL TRAMWAY

Hiromichi Uchiyama, and Yukiyoshi Hatori, both of Tokyo, Japan, assignors to Nissan Motor Co., Ltd., Japan

Continuation of Ser. No. 503,932, Sept. 6, 1974, abandoned. This application Apr. 1, 1976, Ser. No. 672,772
Claims priority, application Japan, Sept. 28, 1973, 48-112998
Int. Cl.[2] B60L *5/08*
U.S. Cl. 191—45 A 2 Claims



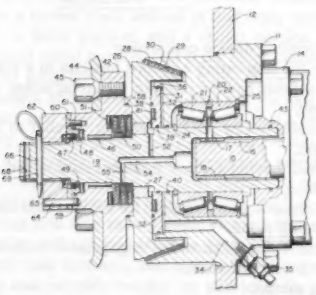
1. In an aerial tramway system having a self-propelled, travelling suspended cable car, a suspension cable for said cable car, a current-collecting system comprising two laterally disposed electrically conductive, current-collecting shoes spaced apart a fixed distance on said cable car and travelling therewith, two electrically conductive, current-carrying cables, a holder depending from said suspension cable and being spaced apart along the conductive cables, the holder having elastic means for elastically holding the conductive cables in a parallel spaced apart relationship a distance less than a distance between contact surfaces on the shoes which in turn make sliding contact with said cables, and said elastic means elastically biasing the conductive cables toward each other and toward respective ones of said contact surfaces for continuously making contact with the shoes as the cable car travels, and said shoes being disposed between the cables spaced downwardly from said elastic means.

4,053,036

WHEEL BRAKE ASSEMBLY

William C. Branham, Minnetonka; Venkat R. Garlapaty, Brooklyn Center, and David W. Berg, Minneapolis, all of Minn., assignors to Tol-O-Matic, Inc., Minneapolis, Minn.

Filed Aug. 25, 1975, Ser. No. 607,294
Int. Cl.[2] F16D *67/02*
U.S. Cl. 192—13 R 12 Claims



1. A combination wheel brake assembly for connection with a rotatable vehicle wheel comprising:

a rotatable axle;

a spring applied, hydraulically released brake assembly including a rotatable brake element rotatable with said axle and a non-rotatable brake element, one of said brake elements being axially movable longitudinally along said axle into frictional engagement with the other to effect braking of said axle;

a wheel hub adjacent to and operatively engaged with said brake assembly and adapted for connection to said wheel and rotatably supported by said axle independently of said brake assembly; and

means for selectively engaging and disengaging said axle and said wheel hub such that when engaged, said wheel hub rotates with said axle, and when disengaged, said wheel hub is freely rotatable relative to said axle and relative to said rotatable brake element.

4,053,037

REVERSING RATCHET

Donald F. Solomon, Newport Beach, Calif., assignor to Jo-Line Tools, Inc., Anaheim, Calif.

Filed June 10, 1976, Ser. No. 694,775
Int. Cl.[2] F16D *41/16*
U.S. Cl. 192—43.1 7 Claims

1. A ratcheting tool for applying torque to a workpiece comprising:

a. a torque transmitting member rotatable about its own axis and having parallel surfaces for engaging a workpiece and arranged in an axially extending configuration of prismatic cross section and further including a coaxial guide element defined in the shape of a portion of a cylinder that is longitudinally disected by an axially extending planar bearing wall and wherein a channel is defined extending transversely through said guide,

b. a work handle terminating in an annular ring positioned adjacent to said torque transmitting member and having an interior surface equipped with radial interiorally directed ratchet teeth, wherein said annular ring and said guide element are positioned in mutual coaxial arrangement to define a cavity between the interior surface of said ring and said bearing wall,

c. a pawl located within said cavity and having an arcuate surface equipped with ratchet teeth for positioning in engagement with said ratchet teeth of said annular ring, and having an opposing bearing surface of overall convex configuration, and having axially extending engagement pins,

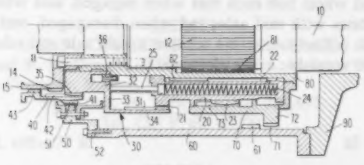
d. a direction indexing member positioned in annular disposition about said guide element and defining two opposing sets of radially extending detent depressions adjacent to and coplanar with said transverse channel of said guide element and having a boss extending toward said pawl and laterally engageable by either of said engagement pins to act through said pins to roll the convex surface of said pawl laterally across said bearing plane to selectively position said pawl within said cavity, and

e. detent means located within said channel and biased radially outward from said guide element to selectively engage either of said sets of detent depression in said indexing member.

4,053,038
SELF-SYNCHRONIZING CLUTCH

Rolland Clyde Herrick, Ambler, Pa., assignor to Philadelphia Gear Corporation, King of Prussia, Pa.

Filed Aug. 12, 1976, Ser. No. 713,646
Int. Cl.[2] F16D *23/10*
U.S. Cl. 192—67 A 19 Claims



1. In a self-synchronizing clutch mechanism for automatically coupling rotatable input means to rotating output means in response to said input means attaining a rotational speed equal to that of said output means, and for automatically decoupling said input means from said output means in response to the rotational speed of said input means falling below that of said output means:

a. an annular carrier mounted coaxially with said input means and coupled to said input means through a first set of helical splines;

b. an annular coupler mounted coaxially with said carrier and carried by said carrier by means of a second set of helical splines;

c. sensing means responsive to said input means attaining a rotational speed equal to that of said output means;

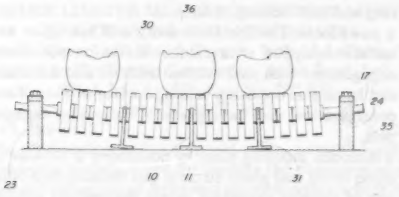
d. carrier constraining means activated by said sensing means for guiding the combined rotational and axial movement of the carrier relative to the said output means, thereby to cause said carrier to move axially and angularly on said first set of helical splines in response to input torque;

e. said coupler, when carried axially by said carrier, being adapted to abut against said output means and in response to said abutment to be moved angularly on said second set of helical splines and into engagement with said output means.

4,053,039
CONVEYOR SUPPORT

Howard P. Shuttleworth, Warren, Ind., assignor to Shuttleworth Inc., Huntington, Ind.

Filed Mar. 23, 1976, Ser. No. 669,509
Int. Cl.[2] B65G *13/00*
U.S. Cl. 193—35 R 10 Claims



1. In a conveyor for moving objects, the conveyor including a shaft supported at first and second locations on said shaft, a plurality of rollers mounted on said shaft between said first and second locations in side-by-side relation, said rollers projecting upwardly from said shaft and being unobstructed to define a discontinuous surface area extending other than vertically between said first and second locations, said objects being held against said discontinuous surface area by gravity, the improvement comprising:

support means for supporting said shaft intermediate of said first and second locations, said support means including a support member having an upright connected to said shaft between two of said plurality of rollers, said support member extending upwardly less than said rollers mounted on said shaft; and

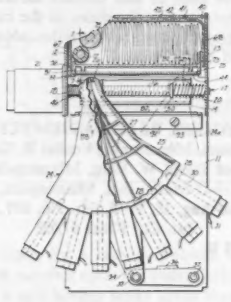
connecting means for releasably connecting said support member to said shaft while said rollers remain on said shaft, said connecting means including a slot defined by said upright within which said shaft is received, said connecting means further comprising a surface positionable against the top of said shaft when said shaft is received within the slot to support said support member upon said shaft;

said support means further comprising a support surface spaced-apart from said support member and positioned to prevent downward displacement of said support member beyond a preselected distance, said support member having a base surface extending outwardly from the upright and positioned to engage said support surface upon downward displacement of said support member the preselected distance, the base surface of said support member being of sufficient area to provide stability upon engagement with said support surface, whereby said base surface engages said support surface when the shaft of the conveyor bends downwardly due to the weight of objects being supported upon the rollers mounted on the shaft, said support member thereby supporting said shaft and said objects and preventing further bending of said shaft.

4,053,040
SERIAL WIRE MATRIX PRINTER

Thomas K. McGourty, 1640 Cox Road, Aptos, Calif. 95003

Filed Oct. 20, 1975, Ser. No. 623,967
Int. Cl.[2] B41J *1/24*
U.S. Cl. 197—1 R 8 Claims



1. A printing device comprising

means for supporting a record medium in a printing plane,

a print head having printing means adjacent said printing plane,

a rotatable screw shaft extending parallel to said printing plane,

said shaft having a screw threaded section and an untreaded section,

a nut connected to said head for moving said head along said printing plane,

said nut being in threaded engagement with said threaded section of said shaft,

spring means,

said nut causing said spring means to flex upon movement of said nut onto said untreaded section upon rotation of said shaft in one direction,

said spring being effective to return said nut into threaded engagement with said threaded section upon rotation of said shaft in the opposite direction, and

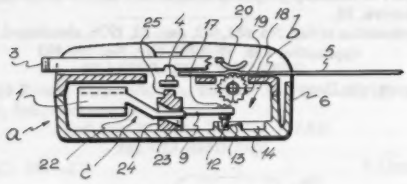
means for rotating said shaft.

4,053,041

LABELING DEVICE

Francisco Barcelloni Corte, Corrientes 2021, Buenos Aires, Argentina

Filed Sept. 8, 1975, Ser. No. 611,007
Claims priority, application Argentina, Sept. 10, 1974, 255536
Int. Cl.[2] B41J 1/30
U.S. Cl. 197—6.7 2 Claims



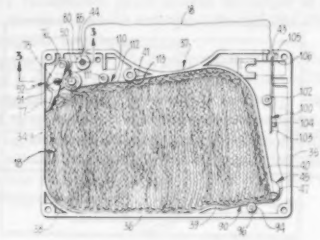
1. In a labeling device of the type that includes a body, a pair of rotatable spaced wheels on said body, a path of travel defined between said wheels and in a first plane through which tape to be imprinted is passed, means for feeding said tape along said path of travel, one of said wheels including elastically deformable arms movable in a direction transverse to said tape, each of said arms carrying a printing element, the other of said wheels including corresponding printing elements, each printing element on each arm cooperating with one of said corresponding printing elements on said other wheel for imprinting a desired character on said tape upon said transverse movement of one of said arms, means for applying pressure to said deformable arms for causing transverse movement thereof for imprinting characters on said tape, a lever pivotally mounted on said body for movement about a first axis for operating said tape feeding means and said pressure applying means, said first axis being transverse to said first plane, and biasing means for pivotally returning said lever to an inoperative position, the improvement comprising, in combination, an arm member pivotally mounted on said lever about a second axis laterally spaced from said first axis, said arm member extending laterally outwardly of said lever, a free end portion being defined on said arm member and having a guide element thereon, said arm being movable in a direction transverse to said first plane, a closed track defined in said body having an initial portion, a latter portion, and a return portion which connects with said initial portion, said track being constructed and arranged to guidably receive said guide element therein both for movement about said second axis and for said transverse movement, said tape feeding means including a sprocket wheel rotatably carried by said body and being constructed and arranged to drivably engage and move said tape in said path of travel, means carried on said end portion of said arm member for drivably engaging and rotating said sprocket wheel for moving said tape as said guide element is moved in said initial portion only of said track in response to pivoting movement about said first axis, said pressure applying means being guidably and movably carried on said lever for movement towards and away from said one printing element on one of said arms for imprinting a desired character on said tape as the guide element is moved in said latter portion only of said track in response to continued pivoting compression of said lever, said guide element moving in said return portion upon movement of said lever to the inoperative position by said biasing means.

4,053,042

ENDLESS RIBBON CARTRIDGE

Ernst P. Hess, Castro Valley, Calif., assignor to Qume Corporation, Hayward, Calif.

Continuation of Ser. No. 530,120, Dec. 6, 1974, abandoned. This application May 19, 1976, Ser. No. 687,716
Int. Cl.[2] B41J 33/10
U.S. Cl. 197—168 11 Claims



1. A cartridge for supplying an endless inked ribbon to a printing station external to said cartridge in an associated printing apparatus, said cartridge comprising:

a housing including a cover member having an inner surface with a downwardly depending arcuate projection and a main body portion having a ribbon entrance slot, a ribbon exit slot and interior boundary walls partially defining an interior ribbon chamber for said endless inked ribbon, said chamber having an exit portion and an entrance portion, the portion of said interior boundary wall partially defining said exit portion including a relieved channel extending transversely along the top surface thereof, said arcuate projection being received within said relieved channel and adjacent said exit portion when said cover member and said main body portion are assembled;

an endless inked ribbon received within said ribbon chamber and arranged in random folds, said ribbon having an upper edge facing said inner surface of said cover member a portion of said ribbon extending from said exit portion through said exit slot and said entrance slot to said entrance portion to form a closed ribbon path;

ribbon transport means for providing a force for translating said ribbon from said exit portion to said entrance portion via said exit slot and said entrance slot, said ribbon transport means including a capstan member rotatably mounted in said housing, said capstan member having a pair of axially spaced flanges and a curved surface portion therebetween; said surface portion having a serrated wall surface;

means adjacent said exit portion for providing a substantially constant drag force on said ribbon; and

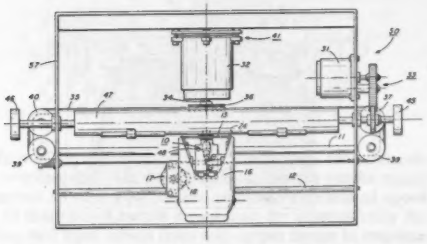
means adjacent said entrance portion and said ribbon transport means for deflecting entering ribbon into said chamber, said drag force means and said deflecting means defining the remainder of said interior ribbon chamber, said drag force means and said deflecting means each comprising a hub portion and a resilient blade portion secured to said hub portion, said blade portion being mounted in a flexed position, one end of said blade portion of said deflecting means being arranged in surface contact with said surface portion of said capstan member so that entering ribbon is deflected thereby, one end of said blade portion of said drag force means being arranged to bias said ribbon against said exit portion of said interior boundary wall,

said arcuate projection having a portion thereof extending along said inner surface beyond said relieved channel and adapted to contact said upper edge of said ribbon for preventing migration of said ribbon from said exit portion in a direction transverse to said ribbon path.

4,053,043
MEANS AND METHOD FOR ENHANCING RIBBON LIFT

David R. Deetz, Dallas, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 29, 1975, Ser. No. 644,391
Int. Cl.² B41J *35/20, 1/24*
U.S. Cl. 197—53 5 Claims



5. A method for reducing the effect of any interference between a print element and a ribbon in a printer during ribbon lift, said method comprising the steps of:

initiating ribbon lift to position the ribbon from a first position to a second position,

providing for linear movement of the ribbon in one direction past a print station,

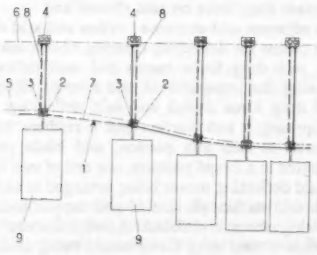
initiating rotation of the print element past the print station in a first direction in preparation for printing a first character subsequent to each initiation of ribbon lift, said first direction being opposite to the direction of linear movement of the ribbon past the print station even if said first direction requires a rotation of greater than 180° to move said first character to said print station; and

initiating rotation of the print element past the print station in a direction providing the least amount of rotation from the character previously printed to the next character to be printed, while the ribbon remains in the second position.

4,053,044
SYSTEM FOR CONTINUOUS ENTRAINMENT AT VARIABLE SPEED

Pierre Patin, 9 rue Nicolas Houel, 75005 Paris, France

Continuation of Ser. No. 585,519, June 10, 1975, abandoned.
This application Oct. 27, 1976, Ser. No. 736,230
Claims priority, application France, June 14, 1974, 74.20681
Int. Cl.² B61B *13/14*
U.S. Cl. 198—334 5 Claims

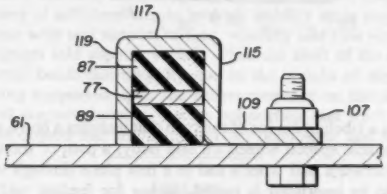


1. A system for continuous entrainment at variable speed along a path of travel, comprising principal movable elements mounted for displacement on a first rolling track and coupled together in pairs by a flexible link of constant length, auxiliary movable elements mounted for displacement on a second rolling track, the spacing between said first and second rolling tracks being variable along at least a part of the path of travel, each said flexible link passing over two deflecting members each one mounted integrally with one of said principal movable elements so that a central portion of each flexible link is always positioned substantially in the direction of displacement, and wherein the two extreme portions of each link are respectively secured to two separate auxiliary movable elements without rigid part between a principal and an auxiliary elements.

4,053,045
RESILIENTLY MOUNTED CONVEYOR BELT CLEANER

Robert C. Reiter, Aurora, Ill., assignor to Material Control, Inc., Aurora, Ill.

Continuation of Ser. No. 651,462, Jan. 22, 1976, abandoned. This application Feb. 17, 1977, Ser. No. 769,493
Int. Cl.² B65G *45/00*
U.S. Cl. 198—499 5 Claims



1. In a conveyor belt cleaner for a conveyor having a rotatable drum and an endless belt trained about said drum for defining delivery and return runs, a support fixedly positionable transversely of and adjacent to one of said runs, a plurality of scraper blades disposed transversely of said one run and a plurality of elongated arms equal in number of said scraper blades and disposed substantially lengthwise of said one run, each arm having one of said scraper blades secured to one end thereof and each arm having a support-engaging means at the opposite end thereof, each of said support-engaging means being individual to its arm and being positioned along the length of the support such that each of said arms is rockable relative to said support and to each of the others of said plurality of arms for moving said blades toward and away from said one run, the improvement characterized in that support-engaging means includes a block of resilient material attachable to the opposite end of said arm for absorbing the shock of said rocking motion and for biasing said arm to urge said scraper blade toward said one run after it has been moved away from the normal plane of said run, and clamping means attachable to said support for resiliently securing said block and the opposite end of said arm to said support for rockable movement with respect thereto without requiring apertures in said block and in the opposite end of said arm, said clamping means including a first substantially rectangular, relatively flat portion having apertures therein, the plane of said first portion defining a reference plane, fastening means engageable with said apertures and corresponding apertures in said support for fixedly attaching said first apertured portion to said support, an integral L-shaped clamping portion having a side portion integral with said first portion and generally perpendicular to said reference plane and a cap portion generally perpendicular to said side portion and extending from the top thereof in a direction opposite to the direction in which said first portion extends, said side portion and said cap portion being dimensionally similar to one another and a tab member integral with said cap portion and depending perpendicularly from the outer longitudinal dimension thereof, said tab member being substantially parallel to said side portion but dimensionally smaller than said side and cap portions, the interior surfaces of said side portion, said cap portions, and said tab member defining an

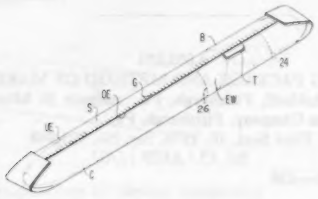
interior clamping portion whose bottom is a portion of said support, said block and the opposite end of said arm being received within said interior clamping portion which resiliently mounts said block and arm for rockable movement with respect to said support, the combined size of said block and said opposite end of said arm being dimensionally greater than the size of said interior clamping portion to insure at least partial compressing of said block within said interior clamping portion, at least one of said faces engaging said opposite end of said arm, said block having a pair of side surfaces, with one side surface engaging the size portion of said L-shaped clamping portion, said second side surface having a notched portion, said tab member being received in said notched portion for retaining said block within said interior clamping portion.

4,053,046

PLASTIC FILM WRAPPER

Eugene Roark, Waycross, Ga., assignor to Jno H. Swisher & Son, Inc., Jacksonville, Fla.

Filed July 29, 1976, Ser. No. 709,920
Int. Cl.² B65D *3/26*
U.S. Cl. 206—274 **7 Claims**



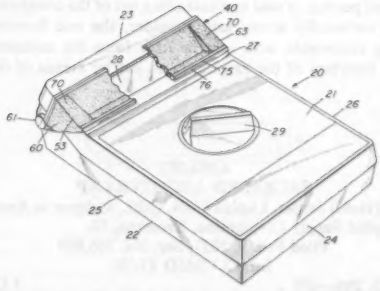
1. A plastic wrapper for commodities
said wrapper being formed of grainless plastic film having underlapping and overlapping edge portions and a heat seal joining said edge portions together along the length thereof so as to form a double-thickness seam, means for initiating a tear across the overlapping edge portion at one part of the length of the seam, and means spaced along the length of said seam for preventing blocking of the continuation of the tear across the other part of the length of the seam.

4,053,047

COMBINATION DISPLAY COVER, HANDLE, AND TILT STAND FOR PORTABLE INSTRUMENT

Joseph R. Andreaggi, Short Hills, N.J., assignor to Weston Instruments, Inc., Newark, N.J.

Filed Apr. 9, 1976, Ser. No. 675,674
Int. Cl.² B65D *25/24, 85/38*
U.S. Cl. 206—45.2 **12 Claims**



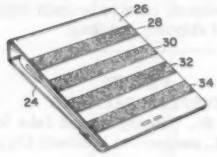
1. For use in conjunction with a portable instrument which includes a housing of generally parallelpiped configuration having relatively large area front and rear opposing surfaces and relatively small area top, bottom and opposing side surfaces, said housing having a display window extending across said front surface relatively near the top edge thereof and substantially parallel to said top edge; a combination display window cover, handle, and tilt stand unit, comprising:
first and second generally triangular members, each pivotally mounted at about one of its corners on opposite side surfaces of said housing and relatively near the top surface of said housing; and
a generally rectangular panel joining the edges of said triangular members which are opposite said one corners of said triangular members;
said triangular members being proportioned such that when said unit is pivoted to its limit over said front surface, said panel overlays said display window and when said unit is pivoted to a position over said rear surface, one edge of said panel is spaced from said rear surface whereby said instrument can be seated on a working surface at a stable tilt position resting on its rear bottom edge and said one edge of the panel.

4,053,048

MATCHBOOKS

Charles C. Cohn, Colonial Alloys Company, 4041 Ridge Ave. - Bldg. No. 11, Philadelphia, Pa. 19129

Filed June 4, 1976, Ser. No. 692,854
Int. Cl.² A24F *27/00*
U.S. Cl. 206—106 **4 Claims**



1. A matchbook comprising:
a comb of matches having a base, a plurality of stems extending therefrom and a head on each of said stems;
a cover having a first portion overlying said base, a first fold forming a first pocket receiving said base, a back portion extending from said first fold to the vicinity of the heads, a second fold forming a second pocket receiving said heads, and a flap portion extending from said second fold along the stems of said matches and into said first pocket between said first portion and said base;
an elongated effective striking surface disposed on the exterior of said cover; and
means for camouflaging said effective striking surface, thereby reducing the probability of the successful striking of a match on said surface by a young child;
characterized by the fact that said effective striking surface is disposed on said back portion of the cover, and also by the fact that said means for camouflaging said effective striking surface comprises an additional elongated surface disposed on said first portion, said additional elongated surface having the appearance of said effective striking surface, but being ineffective to ignite said matches.

4,053,049

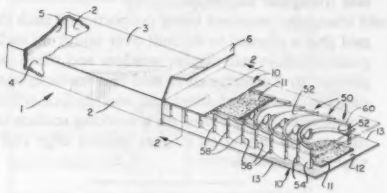
PACKAGING OF SEMICYLINDRICAL SLEEVE BEARINGS

Albert L. Beauvais, Birmingham, Mich., assignor to Federal-Mogul Corporation, Detroit, Mich.

Filed Feb. 19, 1976, Ser. No. 659,383
Int. Cl.² B65D *85/30*
U.S. Cl. 206—318 **6 Claims**

1. A packaging arrangement comprising a plurality of uni-

formly shaped, partially cylindrical parts, each of said parts having a concave front wall and a convex back wall, and being arranged in a planar row in nested relationship such that the leading end portion of the front wall of each said part lightly contacts the back wall of an adjacent leading one of said parts without distorting either of said parts in contact with one another, each of said parts being of uniform height measuring from the top of said walls to the bottom of said walls throughout and being equal in height to each of said other parts, said plurality of parts as nested together forming the compressive member of a cantilever beam defined by the entire said row of parts,



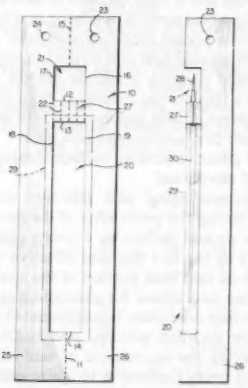
non-stretchable adhesive means disposed on and adhering to the top of said walls and to the bottom of said walls of said parts and encompassing each of said end portions forming the area of contact between said parts and forming along the top and bottom of said walls an upper and a lower tensile member, respectively, of the aforementioned cantilever beam and thereby constituting a unitary package whereby each of said nested parts is absolutely without freedom of movement relative to each other when subjected to normal shipping handling.

4,053,050

DISPLAY PACKAGE

Hampton E. Forbes, Jr., Wilmington, and John M. Nock, New Castle, both of Del., assignors to Westvaco Corporation, New York, N.Y.

Filed Aug. 26, 1976, Ser. No. 718,073
Int. Cl.² B65D *75/04, 85/20*
U.S. Cl. 206—361 **8 Claims**



1. A substantially flat display package for elongated products prepared from a one-piece blank of paperboard or the like and formed from a blank of material having a longitudinal dimension greater than its width dimension, said blank including a centrally located score line along its longitudinal dimension which bisects the blank into two equally sized portions and about which the two equally sized portions are folded into face-to-face contact to enclose a product, the improvement comprising a pair of spaced apart apertures wherein at least one of said apertures is covered with a piece of transparent film material to form a window in said blank and an intermediate means formed from said blank material which separates the window from said remaining aperture for enclosing and retaining a portion of said product, said intermediate means comprising:

a. a symmetrical panel formed by a first pair of cut lines in said blank, said cut lines being spaced apart along the longitudinal dimension of said blank to define the length of said panel;

b. a plurality of secondary score lines in said panel along the longitudinal dimension of said blank wherein said secondary score lines include at least one pair which connect the ends of said first pair of cut lines and a plurality of additional score lines between said pair that are spaced from one another; and,

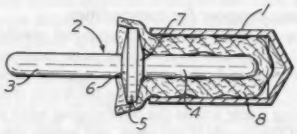
c. a second pair of cut lines in said blank spaced outboard of said first pair of cut lines and which connect with the ends of said first cut lines to define with said first cut lines the spaced apart window and remaining aperture in said blank said remaining aperture exposing a first part of a packaged product for physical examination by a consumer while the window exposes another part of the packaged product to the view of a consumer.

4,053,051

EARPLUG PACKAGE AND METHOD OF MAKING IT

Carl H. Brinkhoff, Pittsburgh, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Sept. 10, 1976, Ser. No. 721,948
Int. Cl.² A61F *11/02*
U.S. Cl. 206—438 **8 Claims**



1. An earplug package comprising a cylindrical container open at at least one end, an earplug inserter having a stem extending axially into said open end of the container and spaced from the side wall of the container, the inserter having an enlarged portion outside of the container forming a shoulder extending laterally away from said stem and spaced from said open end of the container, and a thin sound-attenuating mat of fibers enclosing said stem and disposed between it and the encircling side wall of the container with the free end of said stem pressed against the central portion of the mat, the marginal portion of said mat extending out of the container and flaring outwardly across said shoulder, the mat forming an earplug removable with said inserter from the container to permit insertion of the earplug in an ear by means of the inserter.

4,053,052

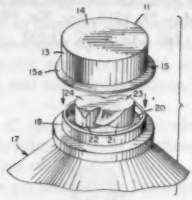
PACKAGED ADDITIVE CAP

Mark Friedel Jasper, Laguna Hills, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Feb. 9, 1977, Ser. No. 766,859
Int. Cl.² B65D *85/70*
U.S. Cl. 206—439 **7 Claims**

1. An additive cap package consisting essentially of a cap having a continuous side wall, a top wall, and a perimetric flange projecting outwardly and continuously about the lower

extremity of said side wall; said cap having sterile interior surfaces; and a backing sheet removably secured to the under-



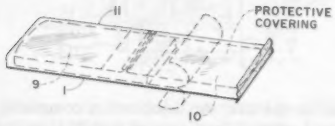
surface of said flange to seal the interior of said cap and to maintain said interior surfaces in sterile condition.

4,053,053

VENIPUNCTURE AID DEVICE

Fidel G. Tumangday, Los Angeles, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 26, 1976, Ser. No. 680,282
Int. Cl.² B65D *85/00*; A61F *15/00*
U.S. Cl. 206—441 **1 Claim**



1. A venipuncture aid device, comprising

a bandage strip having a central area and two side areas each on a corresponding side of the central area and each having pressure adhesive thereon, said bandage strip having a cotton pad affixed to the central area and extending beyond the plane of the bandage strip;

a pair of strips of protective material each removably affixed to a corresponding one of the adhesive covered sides and extending over half the cotton pad;

an alcohol swab on one of the strips of protective material;

a cotton pad on the other of the strips of protective material; and

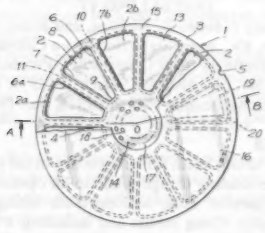
additional protective material releasably antiseptically enclosing the bandage strip, alcohol swab and cotton pad.

4,053,054

PACKAGE HAVING INDIVIDUAL ISOLATED CELLS

Bernard Lucas, Rouen, France, assignor to Padeg A.G., Moehlin, Switzerland

Filed Oct. 7, 1975, Ser. No. 620,498
Int. Cl.² B65D *85/56*
U.S. Cl. 206—534 **9 Claims**



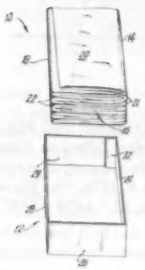
1. A package comprising a single piece of material constituting a plurality of distinct cells and a support to which the cells are connected in a manner disposed around a common center, each cell comprising a bottom wall and side walls and having an opening opposite the bottom wall, the openings of the cells lying in a common plane, all the cells being integrally connected one to the other by said support which is common to all cells and is situated in the plane of the openings, the cells and support constituting a substantially cylindrical body having a central axis with the cells disposed around said axis and extending radially and axially thereof and with an internal zone and a peripheral zone defined on said support, a ring shaped cover fixed on said cells for sealing same, said support having at least one first reference mark capable of determining the disposition of the cells in a determined order in one or more sequences as well as at least one second mark capable of determining the position of the cells with respect to a fixed point, at least one cell comprising at least two compartments, said compartments being constituted by the cell itself on the one hand and at least one sealed chamber placed in said one cell on the other hand, said sealed chamber within said cell containing a sealed product for subsequent utilization.

4,053,055

DISPENSING PACKAGE

Edward Albert Tarbox, Naperville, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jan. 4, 1977, Ser. No. 756,682
Int. Cl.² B65D *31/00*, *85/54*
U.S. Cl. 206—554 **12 Claims**



1. A package comprising in combination:

an array of flat articles arranged in a stack having four vertical faces and two horizontal faces;

a substantially rectangular support frame surrounding said four vertical faces; and

a plastic film enclosure surrounding said frame and said array of articles in a substantially flush relationship, and having a seam lying along at least one of the vertical corners lying between two adjacent vertical faces.

4,053,056

CIGARETTE PACKAGE INSPECTION APPARATUS

John Herbert Day, Midlothian, Va., assignor to AMF Incorporated, White Plains, N.Y.

Filed July 19, 1976, Ser. No. 706,428
Int. Cl.² B07C *5/342*
U.S. Cl. 209—73 **10 Claims**

1. Cigarette pack inspection and conveying apparatus comprising

endless belt conveyor means having pack receiving and delivering ends;

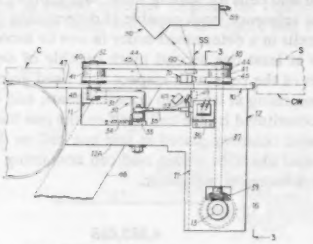
an inspection station and a rejection station disposed in series between said receiving and delivering ends;

said conveyor means engaging the top and bottom ends of cigarette packs and conveying such packs from said receiving end through said inspection station and past said rejection station to said delivering end;

electro-optical scanning means synchronized with incremental pack movement selectively scanning at least a portion

of each pack conveyed through said inspection station and providing signals representing detected pack condition;

logic and signal processing means with a programmable memory connected to said scanning means for receiving therefrom and providing a reject signal when the signals from said scanning means represent a defective package condition; and



reject means connected to said logic and signal processing means for receiving reject signals, and to said conveyor means and causing said conveyor means to release a detected defective pack at said rejection station when a reject signal is received.

4,053,057

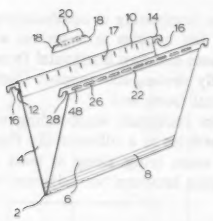
SUSPENDED FILING FOLDERS

Wesley Raymond Snowden, Islington, Canada, assignor to Oxford Pendaflex Canada Limited, Toronto, Canada

Filed May 4, 1976, Ser. No. 682,976

Int. Cl.² A47B *63/00*

U.S. Cl. 211—126 **3 Claims**



1. A suspended filing folder comprising a sheet of flexible material folded along a medial line to form opposed walls joined at their lower edges, and first and second suspension bars secured to the upper edges of the walls and having projecting end portions extending beyond the ends of the walls, the end portions being formed with notches to engage rails in a file, the first suspension bar being bonded within a tubular channel formed by the upper edge portion of one of said walls folded upon and secured to itself to form with said bar a first laminar structure, said structure adapted for engagement with tabs sprung into engagement with said laminar structure, and a folded over upper edge portion of the other of said walls enclosing and bonded to a second suspension bar to form a second laminar structure, all the layers of at least one of said laminar structures being embossed with a longitudinal row of indentations extending longitudinally with respect to the suspension bar and forming detents adapted for engagement with tabs sprung into engagement with said laminar structure.

4,053,058

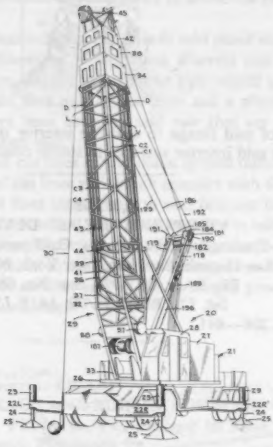
SUSPENDED EXTENSIBLE BOOM

Lyle B. Jensen, and C. Wayne Powers, both of Cedar Rapids, Iowa, assignors to FMC Corporation, San Jose, Calif.

Filed May 27, 1976, Ser. No. 691,045

Int. Cl.² B66C *23/00*

U.S. Cl. 212—8 R **10 Claims**



1. In a crane or the like, the combination comprising an extensible boom having at least two sections that include a fixed base section and a movable tip section, means for extending the tip section relative to the base section, means for pinning said boom sections together to resist bending transversely of the longitudinal axis of the boom in a generally vertical plane and to resist compression axially of the boom, a boom pendant connected to the distal end of the tip section, means for maintaining slack in the boom pendant while the tip section is being extended, means for tensioning the boom pendant to support the distal end of the boom when the boom sections are pinned together for supporting loads with the boom, said boom pendant slack maintaining means including a pendant storage drum about which a portion of the boom pendant is wrapped and a hydraulic motor that pays out the boom pendant only in response to a given pressure, said pendant storage drum being located at the proximate end of the base section, and a live mast assembly being connected to the proximate end of the base section for pivotal movement upwardly of the boom about a horizontal axis, said live mast assembly supporting the boom pendant between the distal end of the tip section and the pendant storage drum.

4,053,059

PORTABLE OVERHEAD CRANE AND METHOD OF INSTALLING IT

Winfield M. Hass; Howard E. Niehaus, and James L. Pack, all of Owensboro, Ky., assignors to Southwire Company, Carrollton, Ga. and National Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 559,484, March 18, 1975, Pat. No. 3,973,679. This application Feb. 23, 1976, Ser. No. 660,755

Int. Cl.² B66C *17/06, 19/02*

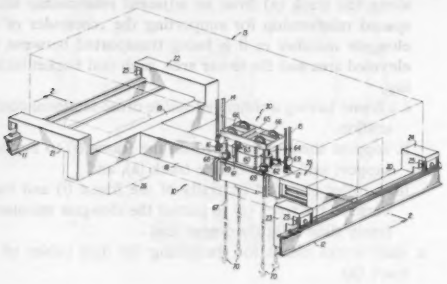
U.S. Cl. 212—18 **9 Claims**

1. A portable lifting beam for being transported to a worksite and lifted by an existing bridge crane to an operative position spanning two parallel rails, said portable lifting beam that support a movable lifting means and including a horizontally extending main beam having means at the ends thereof carrying wheels for rollingly supporting said portable lifting beam on said rails, said main beam including a telescoping section, means for controllably retracting said telescoping section to reduce the longitudinal extent of said main beam to a dimen-

sion less than the distance between said parallel rails whereby said portable lifting beam may be raised and lowered between said rails while being disposed perpendicular thereto, means for controllably extending said telescoping section from its retracted position to increase the longitudinal extent of said main beam to a dimension equivalent to the distance between said parallel rails for positioning said wheels thereon, and means for locking said telescoping section in its fully extended position.

8. A method of operatively positioning a longitudinally extensible portable lifting beam in overhead relation to a load, comprising the steps of:

a. disposing the portable lifting beam beneath an overhead



bridge crane carried by overhead parallel rails with the portable lifting beam aligned transverse to the rails and longitudinally extending a distance less than the distance between said rails;

b. lifting the portable lifting beam with the bridge crane to a position above the rails;

c. extending the portable lifting beam longitudinally to position the extremities thereof over the rails;

d. locking said portable lifting beam in an extended position;

e. lowering the portable lifting beam onto the rails such that it is supported both by the rails and by the bridge crane; and

f. moving both the bridge crane and the portable lifting beam as a unit along the rails to a position above a load.

4,053,060

CRANE

Virgil D. Wilson, 8720 Selger Drive, Springfield, Va. 22153

Filed Feb. 13, 1976, Ser. No. 658,043

Int. Cl.[2] B66C *23/36*

U.S. Cl. 212—48 **28 Claims**

1. A mobile rotary crane comprising

a. a mobile vehicular support,

b. a crane base,

c. means for rotating said crane base with respect to said vehicular support with said vehicular support in a stationary position,

d. a main boom pivotally mounted with respect to said crane base for pivotal movement in a vertical plane about a first horizontal axis from a generally horizontal position to a generally vertical position, said main boom having a free end,

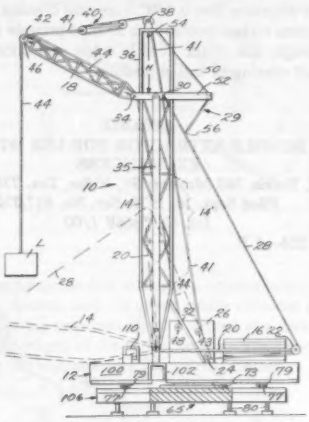
e. means for mounting counterweight on said base on one side of said main boom, said main boom extending away from said counterweight when in said generally horizontal position thereof,

f. a jib boom pivotally mounted to said main boom at a portion thereof near the free end thereof for rotation about a second horizontal axis and located on the load side of said main boom, opposite the counterweight side thereof, said jib boom having a free end,

g. a tower extending from said main boom free end and providing a substantial continuation of said main boom,

h. a first cable connected to the free end of said jib boom, extending over said tower, and to a drive assembly on said crane base, said drive assembly for letting out and pulling in said cable to pivot said jib boom with respect to said tower and said main boom,

i. a lever arm pivotally mounted to said crane base for pivotal movement in a vertical plane about said first axis, said lever arm extending generally perpendicularly to said



main boom toward the counterweight side, and operatively attached to said main boom, and having a free end with a pulley attached thereto, and

j. a second cable extending from a portion of said main boom adjacent the free end thereof around said pulley and to a drive assembly, said drive assembly for letting out and pulling in said second cable to pivot said main boom and said lever arm about said first axis to any position between said generally horizontal and generally vertical position of said main boom.

4,053,061

MOBILE CRANE

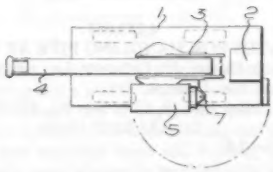
Robert James Lester, Cleadon near Sunderland, England, assignor to Coles Cranes Limited, Sunderland, England

Filed Oct. 2, 1975, Ser. No. 618,859

Claims priority, application United Kingdom, Oct. 5, 1974, 43296/74

Int. Cl.[2] B62D *27/00*

U.S. Cl. 212—58 R **1 Claim**



1. A mobile crane comprising a wheel supported vehicle chassis having a front end and a rear end, an engine compartment mounted on said chassis at said front end, a boom support structure, pivot means for mounting said boom support structure on said chassis for rotation about a vertical axis located on the longitudinal axis at the mid section of said chassis, an extensible boom having a first end and a second end with a load hoist mechanism mounted at said second end, pivot means mounting said first end to said boom support structure for movement

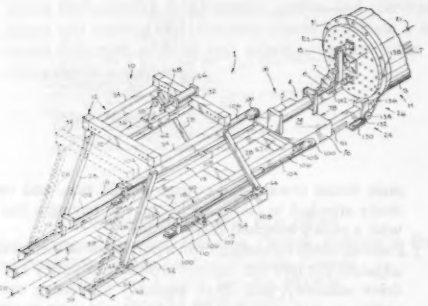
about a horizontal axis, means extending between said extensible boom and said boom support structure for pivoting said extensible boom about said horizontal axis, an operator's control cab, vertical pivot means mounting said control cab at one end thereof to said boom support structure at one side of the latter such that said control cab is pivotable about said vertical pivot means from a craning position in which said control cab is disposed parallel to said extensible boom and facing said load hoist mechanism to a moble crane travel position in which said control cab is located adjacent said engine compartment and faces in a direction that is 180° from said craning position and access means on said control cab so as to provide entry thereto from a single side of the vehicle when said control cab is in either said craning or travel position.

4,053,062

TUBE BUNDLE EXTRACTOR FOR USE WITH HEAT EXCHANGERS

Bobby J. Travis, 345 Mayhaw St., Vidor, Tex. 77662

Filed Sept. 26, 1975, Ser. No. 617,076
Int. Cl.² B66F *1/00*
U.S. Cl. 214—1 P **9 Claims**



8. In a tube bundle extractor of the type having an elongated framework adopted to be suspended from a crane hook and to be secured at one end to the shell of a heat exchanger containing a bundle of tubes attached to an end sheet, the framework supporting a pair of rails adapted to be horizontally and vertically aligned with the heat exchanger to receive the tube bundle, and a car movable along said rails and parallel thereto, said car being adapted for connection to said end sheet, the improvement comprising a number of oppositely acting, parallel linear hydraulic actuators each having its cylinder secured to the framework and its piston extensible parallel to said rails, said linear hydraulic actuators simultaneously acting on the car through sheave and cable means to cause motion of the car.

4,053,063

APPARATUS FOR HANDLING PIPE AT WELL SITE

Roland George Harper, Jr., Lafayette, La., assignor to Weatherford/Lamb, Inc., Houston, Tex.

Filed Apr. 19, 1976, Ser. No. 677,956
Int. Cl.² E21B *19/00*
U.S. Cl. 214—2.5 **5 Claims**

1. Apparatus for transporting an elongate member between an elevated area and a lower area comprising,

a. dual side-by-side support cables forming an inclined track extending between the elevated area and the lower area,

b. a lowermost bucket movable along the track (a) for holding and supporting the lower end of the elongate member, said bucket including,

i. a frame having a concave topside cross-sectional configuration and a stop plate at the rear for abutting the end of the elongate member, and

ii. support sheaves mounted on the frame (i) to movably support said frame on the track (a),

c. cable means for controlling the movement of the lowermost bucket (b) along the track (a),

d. a series of a plurality of interconnected buckets movable along the track (a) from an adjacent relationship into a spaced relationship for supporting the remainder of the elongate member as it is being transported between the elevated area and the lower area, each said bucket including,

i. a frame having a concave topside cross-sectional configuration,

ii. support sheaves mounted on the frame (i) to movably support said frame on the track (a), and

iii. a roller disposed centrally of the frame (i) and transverse to the track (a) to permit the elongate member to freely slide over the frame, and

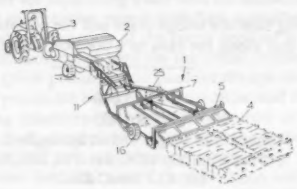
e. drawworks means for slackening the dual cables of the track (a).

4,053,064

HAY BALE COLLECTOR

Garth David Stewart, Nightingale St., Wyndham, New Zealand

Filed June 3, 1976, Ser. No. 692,426
Claims priority, application New Zealand, June 4, 1975, 177703
Int. Cl.² A01D *87/12*; B65G *57/32*
U.S. Cl. 214—6 B **6 Claims**



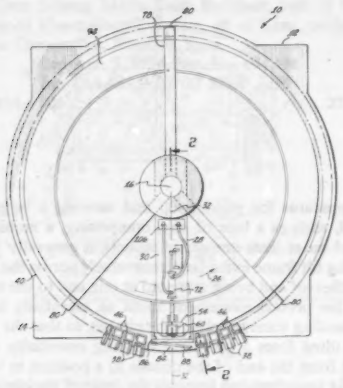
1. A hay bale collector comprising a bale confining frame, ground support means to support said frame for movement over the ground, towing means to allow the frame to be towed over the ground, a rear frame and release gate across the rear of said bale confining frame, a central division in combination with said bale confining frame, defining two adjacent open front bale holding compartments, bale diverting means projecting from the forward end of said central division to divert bales coming into engagement therewith alternatively into one compartment and then the other compartment until both compartments are full, a compression bar longitudinally located in each bale holding compartment to exert a downward force on said bale, said compression bar being centrally located with an upwardly directed forward end and a rearward end adjacent the back of the bale compartment guidable to be lifted against the action of a biassing means to exert a downward pressure on top of the bales in said compartment and opening means to open said release gate, releasing together in a group the bales from the filled compartments.

4,053,065

SEQUENCER

John Lawrence Kowalski, Phoenix, and Kenneth Boyd Tippetts, Glendale, both of Ariz., assignors to Honeywell Information Systems Inc., Phoenix, Ariz.

Filed Aug. 9, 1976, Ser. No. 712,563
Int. Cl.[2] B65G *57/30*
U.S. Cl. 214—6 M 18 Claims



1. A sequencer for assembling in a transferee magazine a plurality of objects of substantially the same size and shape from a plurality of transferor magazines; said sequencer comprising:

a support member,

a plurality of transferor bases mounted on said support member, each of said transferor bases adapted to removably hold a transferor magazine;

a plurality of transferor magazines adapted to hold a plurality of said objects, one transferor magazine being mounted on each transferor base;

positioning means mounted on said support member;

a transferee base mounted on said positioning means, said transferee base adapted to removably hold a transferee magazine;

a transferee magazine mounted on said transferee base;

means mounted on said positioning means for transferring an object from a transferor magazine mounted on a transferor base to the transferee magazine mounted on the transferee base when the transferee magazine is positioned by the positioning means in object transfer relationship with a transferor magazine; and

control means for causing said positioning means to sequentially place the transferee magazine in object transfer relationship with predetermined ones of said transferor magazines and to cause the means for transferring an object, to transfer into the transferee magazine a predetermined number of objects from said predetermined transferor magazines.

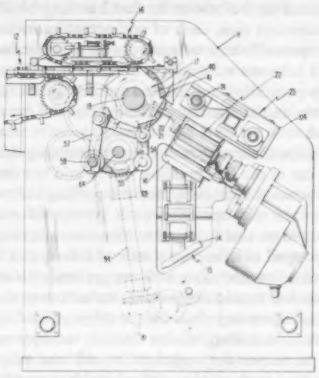
4,053,066

ARTICLE STACKING AND LOADING APPARATUS

Joseph A. Lynch, Westwood, N.J., assignor to Nabisco, Inc., East Hanover, N.J.

Filed Dec. 3, 1976, Ser. No. 747,240
Int. Cl.[2] B65G *57/00*
U.S. Cl. 214—7 8 Claims

1. Article stacking and loading apparatus comprising a pair of inclined rails, a wheel device for placing flat articles on edge on said rails, said wheel device having elements spaced around the periphery thereof for carrying flat articles oriented generally perpendicular to radii of the wheel device, nozzle means for directing a jet of air generally parallel to said rails against each article as that article is transferred from the wheel to the rails, air nozzle means provided along said rails for sliding the articles along the rails and maintaining them in an upright condition, a turret rotatable about an axis parallel to said rail means having a plurality of recesses for receiving columns of articles, a finger mounted for movement along said rails to said



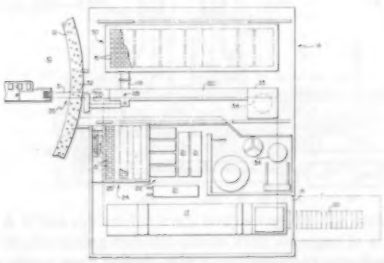
turret for engaging the first article in a column being formed to support the column, and conveyor means adjacent said turret having projecting members equally spaced at a distance comparable to the length of the turret for supporting each column and moving the columns into the turret recesses.

4,053,067

FUEL TRANSFER SYSTEM FOR A NUCLEAR REACTOR

Leonard R. Katz; James R. Marshall, both of Pittsburgh, and Walter E. Desmarchais, Monroeville, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 25, 1973, Ser. No. 373,344
Disclosure was also published under second Trial Voluntary Potest Program on Feb. 3, 1976
Int. Cl.[2] F23K *3/00*
U.S. Cl. 214—18 N 5 Claims



1. A system for transferring fuel assemblies between a fuel handling building and a nuclear reactor wherein the fuel handling building includes new and spent fuel pits and an operating deck on the top surface of walls forming said pits, a reactor containment area separated from said building by a containment wall, and a canal adapted to be filled with water extending from said pits to the reactor containment area to permit submerged movement of the fuel assemblies between the building and the nuclear reactor comprising:

said canal being arranged to extend through said wall and a valve mounted therein for selectively establishing communication between said building and containment area;

a base supporting rails which extend from the building through the canal into the containment area;

a car on said rails and means connected with the car for

providing car linear movement between the fuel handling building and containment area;

a fuel assembly handling container rotatably mounted at its midpoint on said car;

first and second power actuating means respectively mounted on the base in the fuel handling building and the containment area, each of said actuating means including a reciprocable arm associated with the container for rotating it between vertical and horizontal positions;

thereby permitting loading and unloading of a fuel assembly therein and facilitating movement of the car through the canal;

car position indicating means for determining the position of said car in the fuel building and in said containment area, said position indicating means including car position indicators on said operating deck connected with switches mounted on said base and at locations where said car is to be stopped at its extreme ends of travel; and

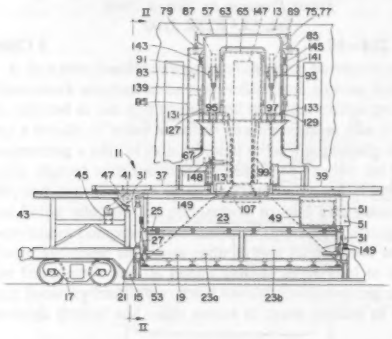
an actuator on said car which cooperates with said switches connected to said car position indicators to thereby show on the operating deck the position of said car; said car position indicating means further includes actuators on said container and switches on said base adapted by said actuators to show the vertical and horizontal orientation of said container.

4,053,068

APPARATUS FOR TRANSFERRING HOT COKE INTO A COKE QUENCHING CAR

Ward Francis Gidick, West Newton, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Aug. 30, 1976, Ser. No. 718,595
Int. Cl.² C10B *39/14*
U.S. Cl. 214—18 R **9 Claims**



1. Apparatus for transferring coke pushed from a coke oven chamber into a receptacle alongside said chamber, wherein the improvement comprises:

a. guide extension means which linearly directs said coke into the center of said receptacle as said coke is pushed through said guide extension means;

b. pivotal means by which said guide extension means is pivoted vertically upwards and downwards in relation to said coke oven chamber;

c. plow means, fixed to said guide extension means, which spreads said coke within said receptacle when said guide extension means is pivoted vertically upwards; and

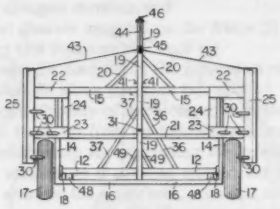
d. gravitation means cooperating with the vertical pivotation of said guide extension means, which allows residual coke remaining in said guide extension means to be deposited into said receptacle as said guide extension means is pivoted vertically upwards.

4,053,069

APPARATUS FOR LIFTING LARGE BALES OF MATERIAL

Phillip Wynell Love, P.O. Box 323, Smithville, Tenn. 37166

Filed May 24, 1976, Ser. No. 688,973
Int. Cl.² B60P *1/28*
U.S. Cl. 214—147 G **12 Claims**



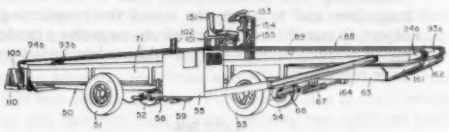
1. Apparatus for picking up and moving a large bale of material, such as a bale of hay, comprising, a mobile chassis mounted on at least one set of wheels; a generally vertically extending tilt frame extending transversely across the chassis at an end thereof and being mounted at one end to the end of the chassis for pivotal movement about an essentially horizontal axis extending transversely of the chassis, so that the tilt frame can be tilted from a position extending essentially vertically upward from the end of the chassis to a position in which the tilt frame leans forward towards the front of the chassis; a pair of rearwardly extending bale clamping members pivotally attached intermediate the tilt frame in mutually spaced relationship and swingable toward and away from each other; means for tilting the tilt frame forward towards the front of the chassis and for swinging the bale clamping members toward each other to clamp a bale, said means for tilting the tilt frame and for swinging the bale clamping members comprising an elongate, flexible member having its ends connected to the free ends of the rearwardly extending bale clamping members a second, elongate, flexible member having one end thereof attached to the first flexible member at a point intermediate its length, said second flexible member passing over means secured to the top of the tilt frame and being connected to winch means at the front of the chassis for pulling said second, flexible member towards the front of the chassis.

4,053,070

RETRIEVING VEHICLE

Tunis Junior Rozeboom, 10329 Springwood Drive, Holland, Mich. 49423

Filed Dec. 3, 1975, Ser. No. 637,151
Int. Cl.² B60P *1/28*
U.S. Cl. 214—505 **8 Claims**



1. A retrieving and collecting vehicle having a frame and means forming a load-receiving surface mounted on said frame, wherein the improvement comprises:

integral U-shaped means having the opposite ends thereof mounted for movement with respect to said frame along a path substantially parallel to said load-receiving surface, said bail ends also being pivotally mounted on a horizontal axis transverse to said path;

positioning means operative to locate the central transverse portion of said bail in spaced relationship above said load-receiving surface, said means forming a load-receiving

surface having a loading end portion at least disposable adjacent ground level; and

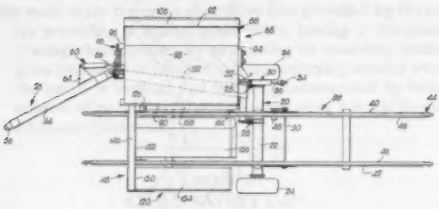
drive means operable to induce movement of said bail along said path.

4,053,071

METHOD AND APPARATUS FOR TRANSPORTING AND PROCESSING MULTIPLE ROUND BALES

Thomas Gene Schrag; Merle Keith Burkhart, both of Newton, and Arnold Elmer Goertz, Buhler, all of Kans., assignors to Hesston Corporation, Hesston, Kans.

Filed Apr. 7, 1976, Ser. No. 674,496
Int. Cl.[2] A01D 90/00; B60P 1/36
U.S. Cl. 214—506 37 Claims



1. In a machine for transporting and disintegrating a body of crop material while on the move:

a mobile bed for carrying the body off the ground during transport;

crop disintegrating structure for said body; and apparatus for transferring the body laterally from a wholly intact position on the bed to a wholly disintegrated position outboard of the normal path of travel of the bed,

all of said structure being disposed outboard of said path of travel of the bed and in disposition to receive the body from said transfer apparatus,

said structure having an outlet for discharging the disintegrated crop material in a stream laterally outboard of the bed.

30. In a method of handling a body of crop material, the steps of:

loading a body onto a mobile bed;

transporting the body on said bed as the latter advances along a path of travel;

transferring the body laterally as advancement of the bed continues;

maintaining the body wholly intact prior to said lateral transfer;

progressively disintegrating the body at a position laterally outboard of the bed as said transfer is effected; and

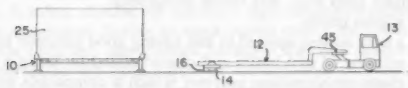
dropping the disintegrated material from said outboard position in a continuous stream as the bed continues to advance along said path of travel.

4,053,072

CONTAINER TRANSPORT SYSTEM AND APPARATUS

Douglas Ross, 3043 122 Pl. NE., Bellevue, Wash. 98005, and Keith Blackburn, 1316 Florence St., Enumclaw, Wash. 98022

Filed Jan. 21, 1977, Ser. No. 765,341
Int. Cl.[2] B60P 1/64
U.S. Cl. 214—512 10 Claims



1. A container transport system comprising,

a pallet frame having corner ground support legs and a center longitudinal guide rail,

a steerable transport vehicle having a rear pallet support frame narrower than the lateral spacing of said legs,

guide means on the vehicle near the rear and lateral center of said pallet support frame adapted to register with said guide rail,

primary wheels and caster wheels mounted on said vehicle near the rear of the pallet support frame,

first level changing means on said vehicle for selectively raising and lowering the forward end of said pallet support frame relative to the ground level between a lowered pallet clearing position and a raised pallet engaging position; and

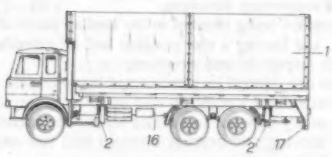
second level changing means on said vehicle for selectively raising and lowering the primary wheels relative to the caster wheels and pallet support frame to responsively move the rear of the pallet support frame between a lowered pallet clearing position whereat only the caster wheels support the rear of the pallet support frame, and a raised pallet engaging position whereat only the primary wheels supports the rear of the pallet support frame, whereby when the pallet support frame is in lowered pallet clearing position, the vehicle can be backed to register the guide means with the guide rail and thereby guide the rear of the pallet support frame beneath the pallet frame as the vehicle is backed further to locate the pallet support frame beneath the length of the pallet frame, and whereby the pallet support frame can then be raised into pallet engaging position to lift the pallet legs free of ground contact so that the pallet frame with its load can be transported by the vehicle.

4,053,073

LEVEL LIFTING SYSTEM FOR TRUCK BODIES OR CONTAINERS

Franco Franchin, Treviso, Italy, assignor to Officine Franchin di Giuliano Franchin & C. S.a.s., Italy

Filed Dec. 15, 1975, Ser. No. 640,977
Int. Cl.[2] B60P 1/54
U.S. Cl. 214—515 4 Claims



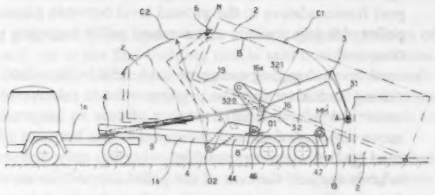
1. A lifting system for truck bodies and the like comprising four double-acting cylinder-piston units arranged in a rectangular array, each cylinder-piston unit in said array having an upper and a lower chamber on opposite sides of the piston of such unit, conduit means serially connecting the lower chambers of one pair of units in the array with the upper chambers of the pair of units which are diagonally opposite in said array, conduit means connected with the upper chambers of said one pair of units and feeding pressurized fluid to said upper chambers in parallel, return conduit means connected with the lower chambers of the second-named pair of units in said rectangular array and returning fluid from said lower chambers in parallel to a source of fluid, a fluid pumping means connected with said source of fluid, and a fluid distributor connected with the pumping means and with the second-named and return conduit means, said double-acting cylinder-piston units having extensible and retractable members which are ground-engageable, and said cylinder-piston units being adapted for attachment to a container body.

4,053,074

DEVICE FOR HANDLING A VEHICLE-CARRIED CONTAINER

Pierre Lemaire, 5 Avenue des Frenes Vaux le Penil, 77000 Melun, France

Filed Oct. 14, 1975, Ser. No. 621,748
Claims priority, application France, Oct. 15, 1974, 74.34553; Feb. 18, 1975, 75.05017
Int. Cl.² B60P 1/64
U.S. Cl. 214—515 4 Claims



1. A device mounted on a generally horizontal supporting structure of a vehicle for loading and unloading a container on and off said vehicle, said device comprising:

a transverse horizontal shaft mounted on said structure substantially intermdiate the length of the vehicle and perpendicular to the longitudinal axis of the vehicle;

a lifting bracket having a rigid upper arm and an articulated lower arm secured thereto, the free end of said upper arm having prehension means for engaging a forward end of a container, said lower arm comprising (i) a rigid unitary upper member having a major portion perpendicular to said upper arm, one end of said upper member adjacent said major portion being rigidly affixed to the other end of said upper arm, and (ii) a lower member having first and second portions angled with respect to each other, a first end adjacent said first portion and pivotally connected to the other end of said upper member adjacent a minor portion of said member, said major and minor portions of said upper member being angled with respect to each other, said lower member having a second end adjacent said second portion thereof and connected to said shaft for pivotal movement of said lower member with respect to said supporting structure,

said bracket being situated in the median plane of said vehicle, and having a rest position and an extended position with respect to said structure;

at least one control jack connected between said supporting structure and a point on said upper member adjacent the boundary between said major and minor portions thereof, for moving said bracket between said rest and extended positions,

said bracket being disposed in said rest position with said major portion of said upper member and said second portion of said lower member substantially horizontal, and said minor portion of said upper member and said first portion of said lower member angled downward; and said second portion of said lower member being substantially vertical in the extended position of said bracket.

4,053,075

HIGH LIFT MOUNTING MEANS FOR LOADER BUCKETS

Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 30, 1976, Ser. No. 718,732
Int. Cl.² E02F 3/74
U.S. Cl. 214—770 9 Claims

1. A construction vehicle comprising

a frame,

a work tool, and

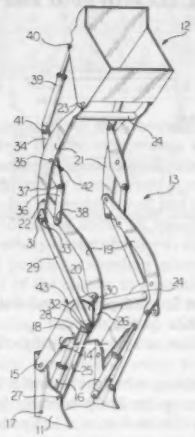
mounting means mounting said work tool on said frame for selectively moving said work tool substantially vertically between lowered and raised positions on said vehicle comprising

first lift arm means having a first end thereof pivotally mounted on said frame,

extensible and retractable actuating means interconnected between said frame and said first lift arm means for selectively raising and lowering said first lift arm means,

second lift arm means having a first end thereof pivotally connected to a second end of said first lift arm means,

third lift arm means having a first end thereof pivotally connected to a second end of said second lift arm means



and having a second end thereof connected to said work tool, and

linkage means pivotally interconnected between said frame and said first, second and third lift arm means for expanding said mounting means from a collapsed condition on said vehicle in response to extension of said actuating means to raise said first lift arm means,

said third lift arm means resting directly upon said first lift arm means when said mounting means is in its collapsed condition and wherein said linkage means begins separating said first and third lift arm means from each other when said first lift arm means is disposed approximately horizontally upon raising thereof by said actuating means.

4,053,076

COATINGS FOR SHATTERPROOFING GLASS BOTTLES

Richard W. Vogel, Vernon Hills; Nick N. Suciu, IV, Lake Bluff; Milton A. Glaser, Glencoe, and John A. Szwedo, Waukegan, all of Ill., assignors to The Dexter Corporation, Windsor Locks, Conn.

Filed June 3, 1976, Ser. No. 692,469
Int. Cl.² B65D 11/16; B32B 9/00
U.S. Cl. 215—12 R 28 Claims

1. A glass bottle coated with a multilayer covering protective film on its surface and characterized by preventing or retarding broken glass fragments of said bottle from scattering around when the bottle is broken, and further characterized by being capable of providing, if desired, the use of a bottle having a thinner glass wall, said bottle comprising:

a. a glass bottle;

b. a base coating applied to and having good adhesion to the exterior of said bottle and characterized by being a soft elastic polyurethane polymer which is compatible with a top coating, said base coating comprising a polyurethane resin produced from a liquid aromatic diisocyanate and a polyol mixture, said polyol mixture having an average

hydroxy functionality between 2 and 3 with an average molecular weight between about 300 and 1000, said polyurethane having an NCO:OH ratio of not less than about 1.1:1.0 and up to 4% by weight of an organo-functional trialkoxy silane based on the weight of said polyurethane; and

c. a top coating applied to said bottle over said base coat and characterized by being a hard tough polyurethane polymer which is compatible with said base coating, substantially abrasion resistant and resistant to washing, said top coating comprising a polyurethane resin produced from a liquid aromatic polyisocyanate and a polyol, said polyol being approximately trihydroxy-functional and having a molecular weight between about 300 and 800, the amount of isocyanate and polyol being regulated to give an NCO:OH ratio of at least about 1.1:1.0;

the multi-layer covering protective film provided by (b) and (c) providing a coated glass bottle having a composite coating characterized by preventing or retarding broken glass fragments of said bottle from scattering around when the bottle is broken, and further characterized by being capable of providing, if desired, the use of a bottle having a thinner glass wall.

4,053,077

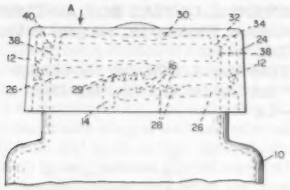
CHILD SAFETY CAP

Amedio DeFelice, c/o Banner Mold & Die Co., Inc., 251 Florence St., Leominster, Mass. 01453

Filed Oct. 19, 1976, Ser. No. 733,869

Int. Cl.² B65D *55/02, 85/56*

U.S. Cl. 215—217 **8 Claims**



1. The combination of a container and a child safety cap for the container, an exterior screw thread on the container and a corresponding interior screw thread on the cap,

interengaging teeth on said screw threads locking the cap in position on the container in closed condition thereof,

resilient means holding the cap in position with the teeth engaged, said resilient means being deformable upon pressing in of the cap with relation of the container to disengage the teeth allowing separation of the cap from the container by rotating the same in the appropriate direction,

said resilient means comprising fingers on the screw threads on the cap located substantially in the area of the teeth of the screw thread on the container.

4,053,078

CHILD SAFETY CLOSURE

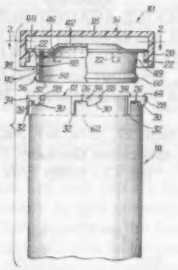
James E. Herr, East Petersburg, Pa., assignor to Kerr Glass Manufacturing Corporation, Los Angeles, Calif.

Filed Aug. 18, 1976, Ser. No. 715,238

Int. Cl.² B65D *55/02, 85/56*

U.S. Cl. 215—222 **18 Claims**

1. A safety closure for moisture tight sealing engagement with a container having an open mouth over which said closure is received, said closure having a top wall adapted to extend across the open mouth of the container and having a depending skirt wall attached to and encircling said top wall, a plurality of locking members formed on the inner surface of said depending skirt wall for cooperation with locking members on the container to selectively retain said closure on said container, said locking members defining locking lug and locking recess interconnection between the container and closure, biasing means within said encircling skirt wall for engaging said container and for being compressed and flexed to bias the locking members on said closure into locking relationship with the locking members on the container until said closure is forced downwardly and rotated relative to the container to release said closure, said closure having an annular



depending wall encircled by said skirt wall for insertion into the open mouth of the container to project downwardly therein a predetermined distance axially below said locking members, and a circumferential radially outward sealing surface located on and adjacent the lower end of said annular depending wall axially below said locking members for sealing engagement with the interior surface of said container generally axially below the lower ends of said locking members on said container.

4,053,079

PALLET CAGES

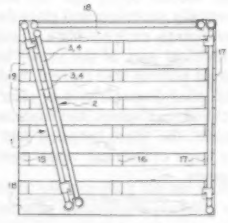
Ladislav Stephan Karpisek, 86 Woodfield Blvd., Caringbah, N.S.W., Australia

Filed Dec. 8, 1976, Ser. No. 748,552

Claims priority, application Australia, Dec. 10, 1975, 4240/75; Mar. 22, 1976, 5291/76; Apr. 28, 1976, 5724/76; Nov. 3, 1976, 8006/76

Int. Cl.² B65D *9/12, 7/00, 7/20*

U.S. Cl. 217—43 A **8 Claims**



1. For a goods pallet comprising at least two parallel bearers with battens fixed to opposite top and bottom edges of the bearers and lying transverse to the bearers, the battens fixed to the bottom bearer edges being pallet support battens and the battens fixed to the top bearer edges being load support battens with two of the load support battens constituting parallel cage securing battens; a pallet cage locking panel comprising a pair of uprights joined by top and bottom rails, to define a substantially rectangular frame, a pair of clips on the bottom rail each clip comprising a leg with a hooked end, the clip legs extend in the same direction away from the panel and the hooked ends extend in opposite directions from outer edges of the legs; the spacing between the hooked end of the clips and the rail bottom in a direction parallel to the plane of the panel being not

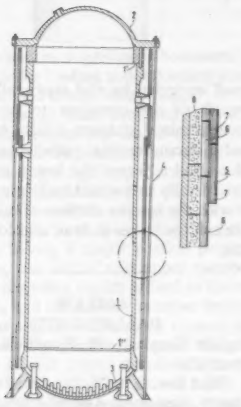
less than the thickness of the cage securing batten; the distance between the outer edges of the legs being not greater than the distance between the cage securing battens; the overall distance between the ends of the hooked ends of the clips exceeding the distance between the cage securing battens but not exceeding the diagonal distance between the intersections of the cage securing battens with adjacent bearers.

4,053,080

PROTECTIVE DEVICE AGAINST RUPTURE OF LARGE CYLINDRICAL VESSELS AND METHOD OF MANUFACTURING SAME

Peter Daublebsky, Frankfurt am Main, Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Sept. 27, 1974, Ser. No. 509,920
Claims priority, application Germany, Oct. 2, 1973, 2349518
Int. Cl.[2] B65D *7/44*
U.S. Cl. 220—3 3 Claims



1. Protective device against rupture of a large cylindrical vessel having a first cover and a first bottom wall and, superimposed respectively thereon, a second cover and a second bottom wall, and further having tensioning members mutually connecting the second cover and the second bottom wall, comprising mutually superimposed rings formed of respective sheet-metal wrappings, each having a plurality of turns wound about the cylindrical part of the vessel between the second cover and second bottom wall thereof, said sheet-metal wrappings have and inner diameter greater than the outer diameter of the large cylindrical vessel, the rupture of which is being protected against, the space between said sheet-metal wrappings and the large cylindrical vessel being filled with light concrete segments.

4,053,081

REINFORCED FILAMENT-WOUND CUT-PORT PRESSURE VESSEL AND METHOD OF MAKING SAME

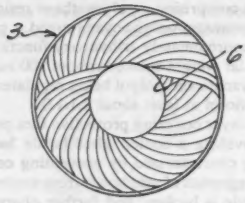
Charles M. Minke, Cumberland, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 20, 1976, Ser. No. 716,461
Int. Cl.[2] B65H *81/06*
U.S. Cl. 220—3 7 Claims

1. A method of making a filament wound pressure vessel having a desired constant helical winding angle and having finally sized polar end openings one of which is larger than the other, comprising:

windably forming an initial pressure vessel structure having a symetrical curvative formed by an elongate cylindrical body portion and ovaloid end portions having identically-sized polar end openings of a diameter no greater than the smaller of said finally sized openings,

said vessel being formed by winding the filament of each layer at a constant helical angle across the length of said body portion and said end portions and said helical angle being one that constantly maintains a winding path that follows a geodesic line of the symetrically-arcuate surfaces being formed,



reinforcing said polar ends of said initial vessel by interspersing a wafer-like mat between each of said filament layers, and

matching at least one of said initial polar ends to enlarge its opening to the desired final size,

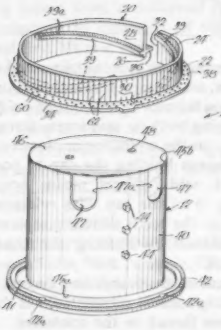
said mats reinforceably encircling the edge portions of said finally-sized openings and being formed of material that is dimensionally stable under pressure vessel operating conditions.

4,053,082

ELECTRICAL OUTLET BOX ASSEMBLY

Frederick E. Ullman, Glencoe, Ill., assignor to Unarco Industries, Inc., Del.

Filed Mar. 1, 1976, Ser. No. 662,569
Int. Cl.[2] H02G *3/12*; F16F *15/00*
U.S. Cl. 220—3.6 24 Claims



1. An electric box assembly for mounting an outlet box within an opening extending between opposite surfaces of a panel, comprising: a ring member formed of a material with an inherently elastic memory and having a generally cylindrically-shaped sidewall having inner and outer surfaces and adapted to be inserted into and seated within said opening, a flange extending outwardly from the outer surface of said sidewall and adapted to bear against one surface of said panel, and means on the inner surface of said sidewall defining cam track means inclined away from the inserted end of said ring member, said sidewall being discontinuous and defining a gap to permit said ring member sidewall to be spread apart from a relaxed position, wherein the diameter of said outer surface is greater than the diameter of said opening, to a spread position wherein the gap is greater than the thickness of the panel whereby the ring member may be inserted through said panel

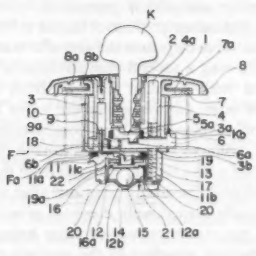
opening by (1) placing one portion of the sidewall adjacent the gap outside the panel, and (2) rotating the ring member relative to the panel to position the entire ring member outside the panel and in the relaxed position said ring member then being insertable in said opening by (1) compressing the ring member from said relaxed position to a compressed position wherein the diameter of said outer surface is smaller than the diameter of said opening, (2) telescopically inserting said ring member in said opening until the flange thereon engages said one panel surface, and (3) releasing the force compressing said ring member whereby the inherent elastic memory of said ring member urges said sidewall toward said relaxed position to position the outer surface of said sidewall in frictional retentive engagement with the wall of said opening; and an outlet box member having a sidewall adapted to be positioned within the sidewall of said ring member, a flange extending outwardly from the sidewall of said outlet box member and adapted to bear against the surface of said panel opposite from the surface engaged by the flange on said ring member, and cam follower means on the sidewall of said outlet box member and adapted to engage said cam track means when said outlet box member is rotated relative to said ring member, whereby said cam track means and cam follower means cooperate to move the flanges on said ring member and outlet box member toward one another and into clamping engagement with said panel.

20. A ring member for an electric box assembly for mounting an outlet box within an opening extending between opposite surfaces of a panel, comprising a generally cylindrical sidewall adapted to be seated within said opening, said sidewall having inner and outer surfaces and opposite ends, a flange integral with said sidewall and extending outwardly from said outer surface, said flange having first and second opposed surfaces extending perpendicular to the axis of said generally cylindrical sidewall, said first surface of said flange being spaced a greater distance from one end of said sidewall than said second surface is spaced from the opposite end of said sidewall, said sidewall and flange being formed of a material with an inherent elastic memory and being discontinuous to define a gap permitting said ring member sidewall to be spread apart and compressed from a relaxed position, and a plurality of circumferentially spaced cam tracks integral with said sidewall and extending inwardly from said inner surface, each of cam tracks comprising a thin rib having opposed parallel surfaces inclined with respect to a plane extending parallel to said first and second surfaces of said flange, said ribs having opposite ends respectively located on planes extending parallel to said plane so that either of said first and second surfaces can be positioned to engage a surface of said panel to accommodate panels of different thickness.

4,053,083
MOTOR VEHICLE FUEL TANK CAP

Masakazu Hukuta, Tsushima, Japan, assignor to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Japan

Filed Oct. 4, 1976, Ser. No. 729,239
Int. Cl.² B65D *51/16*
U.S. Cl. 220—202 **4 Claims**



1. In a motor vehicle fuel tank cap comprising a lock means portion permitting said fuel tank cap to be held in locked attachment to the inlet of the fuel tank of a motor vehicle and defining at least one passage through which external air may pass in order to enter said fuel tank, a motor vehicle fuel tank cap comprising an attitude-sensor valve unit which is provided on said air passage, which is open when said motor vehicle is in a normal, generally upright attitude, and which closes said air passage when said motor vehicle is inclined more than a certain amount from an upright attitude, said attitude-sensor valve unit comprising:

a main housing having an upper portion including means defining an upper opening constituting a portion of said air passage, a lower wall portion defining a central, downwardly curved concave portion, and said main housing having at least one lower opening constituting a portion of said air passage and leading to said fuel tank;

a weight ball element which is normally seated in a lowermost portion in said lower wall central portion and which may freely roll from said lowermost portion when said motor vehicle and fuel tank cap are inclined away from said normal, generally upright position;

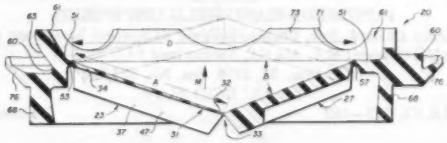
a mantle element fitted loosely in the lower portion of the valve unit and positioned over and around said weight ball element, the upper surface portion of said mantle element normally being below the level of said upper opening and said mantle element being movable upwards and towards said upper opening by said weight ball element when said weight ball element moves from said lowermost position; and

'sealing means defined by at least said upper opening at the lower surface of the upper portion of said main housing and which cooperates with the upper surface portion of said mantle element to seal said upper opening when said motor vehicle is inclined more than a certain amount from said normal, generally upright attitude and said mantle element is moved upwards more than a certain amount by said weight ball element.

4,053,084
FILLER PLUG

Bruce W. Anderson, Rosemont, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Mar. 1, 1976, Ser. No. 662,868
Int. Cl.² B65D *49/02*; F16K *21/04*
U.S. Cl. 220—229 **18 Claims**



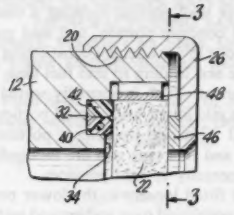
1. A one-piece plastic closure plug for use with an aperture formed in a wall, the plug including a plurality of petal flaps conically arrayed with hinged connections to said plug, and said flaps including structure so that they are originally pointing outwardly in one direction away from the plane of said wall, each petal including a peripheral rib formed along those petal flap edges located adjacent other petal flap edges to provide petal flap edges of extended thickness, said edges of extended thickness being bevelled to provide a predetermined included angle between said adjacent edges, said petal flaps further including means arranged and shaped to form an inverted cone pointing inwardly in a direction opposite to said one direction and toward the opposite side of the plane of said wall after plug use with said adjacent bevelled extended thickness flap edges being in intimate, substantially planar contact to abuttingly support one another and inhibit outward flow of material through the closure plug, and fastener means for mounting the plug in and on the wall aperture.

4,053,085

DISSIMILAR MATERIALS SEAL FOR HIGH PRESSURE, HIGH TEMPERATURE AND CHEMICALLY REACTIVE ENVIRONMENTS

David Brown, Cambridge, and Reginald Tobias, Watertown, both of Mass., assignors to Block Engineering, Inc., Cambridge, Mass.

Filed Oct. 10, 1975, Ser. No. 621,403
Int. Cl.[2] B25D *53/02*
U.S. Cl. 220—378 4 Claims



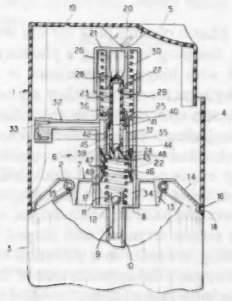
1. A device for demountably sealing a gas tight cover about the periphery of an aperture in a metallic container, the juxtaposed cover and the container being of dissimilar materials, the novel combination comprised of a metallic container having an aperture therein, a cover, the cover being shaped to conform to and close the aperture when juxtaposed thereto, a first and a second gasket seal, the first seal being of chemically resistant material and mounted concentrically with and interiorly to the second seal, the second seal being of load bearing elastomer material, the cover and the container being juxtaposed with the gasket seals there between about the periphery of the aperture in the container, and a generally annular metallic thermal conductor, the thermal conductor being mounted coaxial with and exterior to the second gasket seal and through means in thermal contact with both the cover and the metallic container, whereby the cover may be tightly sealed to the container, the load bearing elastomer seal being protected from reactive chemicals within the container by the presence of the interiorly mounted chemical resistive seal, and the container and its cover being maintained in thermal equilibrium by means of the annular thermal conductor mounted about the periphery of the cover.

4,053,086

PUMPS FOR HAND-HELD DISPENSERS

Andre DeBard, Buc, France, assignor to Aerosol Inventions & Development S.A. Ald SA, Switzerland

Filed Mar. 31, 1976, Ser. No. 672,320
Int. Cl.[2] B67D *83/14*
U.S. Cl. 222—182 9 Claims



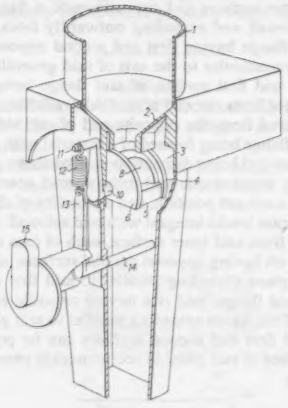
1. A manually-operated reciprocating pump for liquids comprising a pump body with a piston slidable therein, resilient return means operatively connected to the piston for moving the piston in one direction, an actuating member connected to the piston through resiliently-releasable means during movement of said piston in the said one direction, and releasing means mounted on the pump body engagable by said resiliently-releasable means adjacent the end of the travel of the actuating member in the said one direction, to release the resiliently-releasable means, thereby disengaging the piston from the actuating member, and allowing the return of the piston under the action of said resilient-return means.

4,053,087

DISPENSER FOR GRANULAR MATERIAL

Bryan Edward Charles Lack, and Alec Thomas Newman, both of Banbury, England, assignors to General Foods Limited, Banbury, England

Filed Nov. 28, 1975, Ser. No. 635,840
Int. Cl.[2] G01F *11/10*
U.S. Cl. 222—278 3 Claims



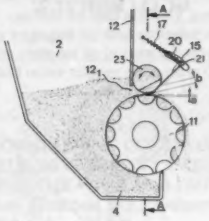
1. A dispenser for dispensing predetermined amounts of particulate or granular material, which comprises a funnel-shaped inlet leading downwardly into a dispensing zone, a two-compartment bucket valve comprising a base with two side walls and a central vertical partition, said bucket valve mounted on a central spindle within the dispensing zone and operating means for tipping the bucket valve from a position wherein the granular material is prevented from being dispensed to a first dispensing position wherein a first compartment of the bucket valve dispenses the granular material, while simultaneously allowing a second compartment of the bucket valve to be filled with granular material from a container located above the inlet, and returning the valve to a second dispensing position wherein the second compartment dispenses granular material, while simultaneously allowing the first compartment to be filled with granular material from the container, in said first and second dispensing positions after said first and second compartments respectively dispense granular material further granular material is prevented from being dispensed, and a latch mechanism attached to the operating means and adapted to be released by a coin-operated mechanism and locked upon returning the bucket valve to he second dispensing position.

4,053,088

ROTARY DISPENSER WITH DELIVERY REGULATING VALVE AND SCRAPER

Xavier Roger Grataloup, Montereau (Seine et Marne), France, assignor to Nodet Gougis, France

Filed Jan. 5, 1976, Ser. No. 646,439
Claims priority, application France, Jan. 10, 1975, 75.00777
Int. Cl.[2] G01F *11/10*; B65D *83/06*
U.S. Cl. 222—312 10 Claims



1. A regulating dispenser comprising a hopper having a dispensing opening of a predetermined height and length, a dispensing member positioned within said dispensing opening for the full width thereof and at a heighth less than the height of said opening and in combination with said hopper defining a slot through which material within said hopper may be moved out of said hopper above said dispensing member, said dispensing member having a movable dispensing surface positioned for movement from within said hopper to outside of said hopper, said movable dispensing surface including at least one delivery area and at least one non-delivery area spaced along the width of said opening, a regulating valve positioned between said moving surface and said hopper above said opening for controllably partially closing said slot, and a scraper mounted independently of said regulating valve and bearing on said movable dispensing surface close to said regulating valve, said scraper bearing elastically on said movable dispensing surface at least in said non-delivery area to ensure sealing of said non-delivery area against delivery of material from said hopper through said slot.

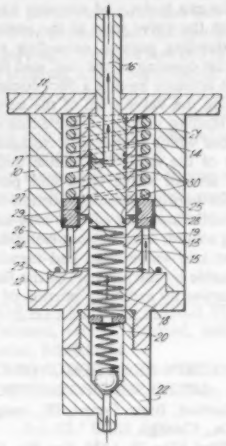
4,053,089

PUMP FOR DISPENSING LIQUIDS

Rustom Kooverji Gamadia, London, England, assignor to Lever Brothers Company, New York, N.Y.

Continuation-in-part of Ser. No. 604,744, Aug. 14, 1975, abandoned, which is a continuation of Ser. No. 528,642, Dec. 2, 1974, abandoned. This application June 3, 1976, Ser. No. 692,515
Claims priority, application United Kingdom, Aug. 1, 1975, 32268/75; Aug. 1, 1975, 32269/75; Mar. 3, 1976, 8495/76; Mar. 23, 1976, 11641/76
Int. Cl.[2] G01F *11/32*
U.S. Cl. 222—321 17 Claims

1. A finger operable pump for dispensing liquids comprising:
a. an axially arranged feed chamber having a finger displaceable end wall, axial movement of which will vary the volume of said feed chamber;
b. a pressure actuable valve to permit entry of a liquid product from an external supply to the feed chamber, said valve and said feed chamber being so positioned that downward axial movement of the finger displaceable end wall toward said valve reduces the volume of the feed chamber and increases hydraulic pressure therewithin, and upward axial movement of the finger displaceable end wall away from said valve increases the volume of the feed chamber and reduces hydraulic pressure therewithin;
c. an axial discharge chamber in communication with said feed chamber;
d. a resilient means positioned co-operably with the discharge chamber for storing energy generated by the increased hydraulic pressure which results from downward movement of the finger displaceable end wall with respect to the feed chamber;
e. a discharge conduit communicating the discharge chamber with the atmosphere exterior to the pump;
f. valve means for releasing the energy stored in the resilient means and for conducting the liquid product from the



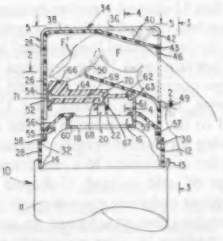
discharge chamber to the discharge conduit, said valve means being operable to release the energy and provide a conduit for the liquid product only after the finger displaceable end wall has moved downwardly with respect to the feed chamber by a predetermined distance, the finger displaceable end wall forming a liquid tight seal with a side wall of the chamber at least until after said valve means is operated.

4,053,090

CAP AND VALVE ACTUATOR FOR SPRAY DISPENSERS

Ronald L. Kelly, Elk Grove, and Efrem M. Ostrowsky, Highland Park, both of Ill., assignors to VCA Corporation, Baton Rouge, La.

Filed Aug. 22, 1974, Ser. No. 499,462
Int. Cl.[2] B65L *83/14*
U.S. Cl. 222—402.13 4 Claims



1. A two-piece cap and valve actuator for use in connection with an aerosol spray dispenser which is part of an aerosol container, comprising: a cap and a separate valve actuator member positioned therewithin, one of said cap and said valve actuator member having spaced openings around its lower portion to receive spaced ears provided on the other of said cap and said valve actuator member to secure said cap to said actuator, said cap positioned over the top of the aerosol con-

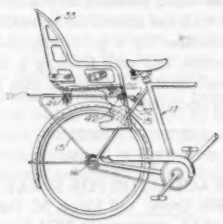
tainer and with the valve actuator member cooperating with the depressible discharge part of the spray dispenser, said cap having a cap body with a circumference substantially that of the aerosol container so as not to extend substantially outwardly thereof to permit containers with caps to be positioned contiguous to each other, said cap having an outlet opening at the front side thereof, said cap having a finger receiving socket extending inside said cap and accessible through a side rear opening of the cap body, said actuator having means for engagement with the valve stem of the aerosol container and a forwardly extending portion extending substantially to the front side outlet opening of the cap, said forwardly extending portion of the actuator having a duct communicating with the means engaging the valve stem of the aerosol container, said forwardly extending portion of the actuator having means at the forward end which is manually engageable by the forepart of the finger of the hand for manual depression to thereby operate said aerosol valve stem and permit the discharge through the forwardly extending portion of said actuator and through the outlet opening of said cap, said finger receiving socket having a rigid, fixed bottom wall which extends at least over and past said valve stem and terminates short of said means engageable by the forepart of the finger at the forward end of said forwardly extendng portion of said actuator.

4,053,091

COMBINATION REAR LUGGAGE CARRIER AND CHILD SEAT FOR BICYCLE

Ronald G. Martelet, River Forest, Ill., assignor to Sears, Roebuck and Co., Chicago, Ill.

Filed May 28, 1976, Ser. No. 690,889
Int. Cl.² B62J *11/00*
U.S. Cl. 224—32 A **1 Claim**



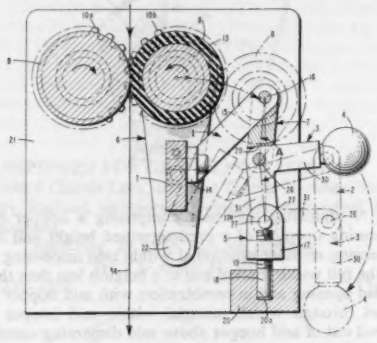
1. An attachment for bicycles and the like comprising a luggage carrier formed of rod-like members and having means for mounting on the rear frame of a bicycle, and a child carrier removably secured on said luggage carrier, said luggage carrier including a first U-shaped member having parallel longitudinal legs connected by a first bight portion, a second U-shaped member having parallel longitudinal legs connected by a second bight portion, said bight portions being oppositely arranged, a tie bar connected to each of said legs intermediate said bight portions, the legs of said first U-shaped member being connected to the bight portion of the second U-shaped member and having forward diverging extensions and carrying clamping means for securement to a rear frame member of said bicycle, the legs of said second U-shaped member having depending extensions embracing a rear cycle wheel and having perforated extremities for attachment to another portion of said rear frame member in close proximity to the axle of the rear cycle wheel, said child carrier being formed of molded plastic and having a seat portion, a back, side walls, and depending leg receiving portions straddling the rear cycle wheel, a sheet metal bracket secured to the underside of said seat portion, said bracket including a vertical leg disposed between the depending leg receiving portions of the child carrier, said vertical leg having a struck-out lug constituting a downwardly opening socket engageable with said second bight portion, said vertical leg having a lateral notch at each side edge with the parallel legs of said first U-shaped member being engageable in said notches and removably secured therein, and locking elements carried on the underside of said seat portion for clamping engagement with the legs of said U-shaped members.

4,053,092

DISENGAGEABLE ROLL POSITIONING APPARATUS

Arthur Wayne Edwards, Rte. No. 2, Box 257A, Mechanicsville, Va. 23111

Filed Feb. 25, 1976, Ser. No. 661,321
Int. Cl.² B65H *17/22*
U.S. Cl. 226—90 **2 Claims**



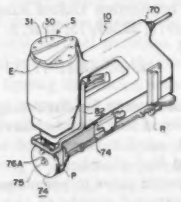
1. A roll positioning apparatus for urging a passive roll into engagement with a drive roll comprising a self-aligning yoke assembly cooperatively joined to a locking lever mchanism comprised of three interacting members pivotably connected at three sites and communicating between an adjustable anchor base and said yoke assembly, said three interacting members comprising: (1) a yoke anchor attached at one extremity to said yoke assembly and attached by means of an upper pivot pin at its opposite extremity to (2) a moving clevis which is attached by means of a middle pivot pin at its opposite extremity to (3) a lever which at its opposite extremity is attached by means of a lower pivot pin to an adjustable anchor base.

4,053,093

AIR-ACTUATED STAPLING GUN IMPROVEMENT

Stephen E. Thueringer, P.O. Box 284, North Bend, Wash. 98045

Continuation-in-part of Ser. No. 636,025, Nov. 28, 1975, abandoned. This application Aug. 19, 1976, Ser. No. 716,020
Int. Cl.² B25C *5/06*
U.S. Cl. 227—5 **4 Claims**



1. In an air-operated stapling gun having a staple driver, a housing provided with a cylinder, a piston operatively disposed in said cylinder and connected to said staple driver, staple magazine means coupled to said housing and operatively aligned with said staple driver for sequential, single-staple ejection, the combination of said housing and said staple magazine means providing a staple-ejection nose accommodating said staple ejection, said housing being provided with an air-pressure inlet and also air-exhaust vent means, trigger means operatively coupled to said housing and comprising outer and

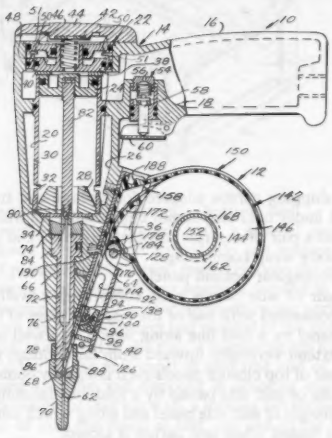
inner trigger elements, and valving means intercoupling said piston and air-pressure inlet and said air-exhaust vent means for enabling air-pressure reciprocation of said piston in successive cycles, said valving means having a valve control means for initiating each of such cycles, said trigger means being cooperatively disposed with respect to said valve control means: an improvement comprising a spring-biased slide member slideably carried by said housing, a work-surface engaging friction wheel pivotally mounted to said slide member and having actuator means and a peripheral surface disposed proximate said ejection nose, and operative means coupled to said inner trigger element, carried by said stapling gun, and proximate to and periodically engaged by said actuator means for actuating said inner trigger element to in turn actuate said valve control element when said outer trigger element is manually depressed.

4,053,094

CARTRIDGE CONTAINING CONTINUOUS WIRE COIL AND PORTABLE DEVICE FOR CUTTING SUCCESSIVE LENGTHS FROM THE WIRE AND DRIVING THE SAME

Robert E. Males, Cranston, R.I., assignor to Textron, Inc., Providence, R.I.

Filed May 6, 1976, Ser. No. 683,816
Int. Cl.[2] B25C *1/04*; B65H *17/52, 49/02*
U.S. Cl. 227—93 27 Claims



1. A portable power-operated device for use with a continuous strand of fastener material for cutting off successive short lengths from the free end portion of said strand and driving the same into a workpiece comprising:

a housing structure including (a) a handle portion adapted to be manually grasped by a user for purposes of handling the device, (b) means defining a drive track of a cross-sectional size generally similar to the cross-sectional size of the strand, said drive track including a discharge end and an opposite end and (c) means defining a feed opening intersecting said drive track intermediate the ends thereof including a surface facing toward the opposite end of the drive track which intersects a drive track defining surface to form a strand cutting edge,

feed means mounted on said housing structure for effecting a movement of the strand in a direction toward the free end thereof during a feed movement of said feed means,

a fastener driving element having a strand cutting end, said element being slidably mounted in said drive track for movement through drive and return strokes between (a) a strand receiving position wherein said cutting end is spaced from said cutting edge in a direction toward the opposite end of said track whereby a free end portion of said strand may be moved through said feed opening angularly past said cutting edge and into said drive track toward the discharge end thereof into an operative position in response to a feed movement of said feed means, and (b) a fastener driving position wherein said cutting end is adjacent the discharge end of said drive track,

power operated means carried by said housing structure for effecting successive cycles of movement of said feed means and said fastener driving element, of which each cycle includes (a) a feed movement of said feed means to move a free end portion of said strand into said operative position, (b) a drive stroke of said fastener driving element to cut off a short length from the free end of said strand by a cooperative shearing action between the cutting end of said fastener driving element and said cutting edge and to drive the cut-off length outwardly of the discharge end of said drive track into a workpiece, and (c) a return stroke of said fastener driving means, and

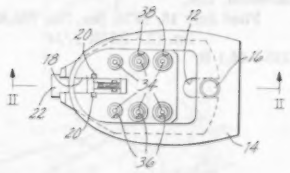
manually actuated means including a trigger carried by said housing structure adjacent said handle portion for digital actuation by a user manually gripping said handle portion for actuating said power operated means.

4,053,095

SUPPORT FOR ATTACHING HEELS TO SHOES

Trevor Norman Coleman, Oadby, England, assignor to USM Corporation, Boston, Mass.

Filed May 3, 1976, Ser. No. 682,639
Claims priority, application United Kingdom, Jan. 21, 1976, 2279/76
Int. Cl.[2] B27F *7/00*
U.S. Cl. 227—135 1 Claim



1. A shoe support for use in a machine for attaching sharply tapering heels to shoes comprising, in combination, a member having a plurality of nail guides in each of which a nail can be located to be driven into forward portions of the heel seat and heel of a shoe, a gauge means mounted on the member for locating the heel seat of the shoe thereon, a staple guide formed in the member and disposed rearwardly thereof so that a staple can be located to be driven forwardly into the tapered rearward portion of the heel seat and heel of the shoe, said staple guide being positioned rearwardly of the nail guides and inclined relative thereto to direct legs of the staple in said staple guide toward a central region of the heel being attached, and driving means including a portion aligned with the nail and staple guides, respectively, to drive the nails and the staple in said guides.

4,053,096

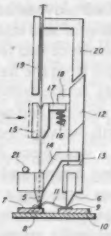
THERMOCOMPRESSION WELDING DEVICE

Richard Heim, Moosburg, Germany, assignor to Texas Instruments Deutschland GmbH, Freising, Germany

Filed June 25, 1976, Ser. No. 699,915
Claims priority, application Germany, June 27, 1975, 2528806
Int. Cl.[2] H01L *21/603*
U.S. Cl. 228—4.5 17 Claims

1. Thermocompression welding apparatus for welding areas between a contact area of a semiconductor body and a corresponding contact area of a housing for said semiconductor body, including a welding capillary from the mouth of which the contacting wire emerges for application by said capillary to

one of said contact areas to effect a weld between said one contact area and said connecting wire, the improvement comprising a separate welding tool laterally displaced from said welding capillary by a distance corresponding to the separation of said contact areas and means for moving said welding



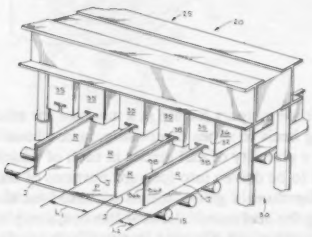
capillary and said welding tool through a path movement toward and away from said contact areas for applying said welding capillary and said welding tool simultaneously to engage said connecting wire against the two respective contact areas and to weld said connecting wire to said contact areas.

4,053,097

ARRANGEMENT FOR PLACING AND MAINTAINING REINFORCING MEMBERS IN PREDETERMINED RELATIONSHIP RELATIVE TO A WELDMENT COMPONENT

Richard L. Linam, League City, Tex., assignor to Kelso Marine, Inc., Galveston, Tex.

Filed July 15, 1976, Ser. No. 705,450
Int. Cl.² B23K *1/14*
U.S. Cl. 228—44.1 R **6 Claims**



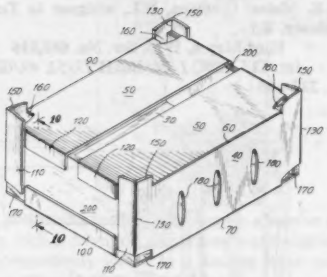
1. An arrangement for supporting reinforcing members as they are welded to a plate including:
   a. support means including a pair of I beams extending longitudinally and parallel to each other in spaced relation;
   b. a plurality of spaced members to guide and support the reinforcing members as they are welded to the plate;
   c. means connecting said members to said support means;
   d. means for simultaneously moving said spaced members on said connecting means longitudinally of said support means including:
      1. motor means;
      2. a pair of lead screws extending longitudinally of said support means and in spaced, parallel relation to each other;
      3. shaft means connected for rotation by said motor means extending transversely of said lead screws;
      4. spaced worm gear means mounted on said shaft means and engaged with said lead screws;
      5. additional shaft means extending transversely of said lead screws and rotatably mounted in each of said spaced members;
      6. additional spaced worm gear means mounted on said additional shaft means and engaged with said lead screws;
      7. control means carried by each of said spaced members to control rotation of said additional shaft means whereby rotation of said shaft means rotates said lead screws and simultaneously moves said spaced members therealong; and
   e. additional means moving said spaced members independently of each other longitudinally of said support means.

4,053,098

SHIPPING CARTON

Brian Kent Baptist, San Jose, Calif., assignor to International Paper Company, New York, N.Y.

Continuation-in-part of Ser. No. 576,717, May 12, 1975, abandoned. This application Aug. 10, 1976, Ser. No. 713,195
Int. Cl.² B65D *13/04, 5/02*
U.S. Cl. 229—23 R **2 Claims**



1. A shipping carton adapted for storage and transport of produce under cold and humid conditions comprising a body wrap and a pair of separate substantially rigid end panels,
   said body wrap comprising:
      a rectangular bottom panel,
      a pair of side panels each comprising a wall integrally connected with one of the opposite sides of the bottom panel by a fold line along which said wall is folded to extend vertically upward from said bottom panel,
      a pair of top closure panels each integrally connected with one of said side panels by a fold line defining the upper margin of said side panel and along which said top panel is folded when said carton is closed,
   said substantially rigid end panels each comprising:
      a rectangular multi-wall adhesively laminated corrugated board made up of at least two corrugated mediums enclosed by facing boards, each end panel having top, bottom and end edges, and at least said mediums and the interior facing boards being impregnated with a moisture resistant rigidifying agent,
   a pair of bottom panel flaps integral with said body wrap and each integrally connected with one end margin of said bottom panel by a fold line along which said flap is folded upwardly to lie upon the outer surface of one of said separate end panels thus to secure said bottom panel to both of said end panels with said end panels extending vertically upwardly from said bottom panel with the bottom edges thereof resting on said bottom panel,
   four side panel flaps each integrally connected with one vertically extending side margin of each of said side panels of said body wrap by a fold line along which said flap is folded to lie upon the outer surface of one of said separate end panels with the inner surface of the adjacent side panel extending firmly in contact with the adjacent end edge of said end panel,
   each of said four side panel flaps extending vertically in secured contact with said outer surface of the adjacent end of one of said end panels from substantially the level of said bottom panel to the top margin of said end panel,

stacking tabs extending upwardly from the top margins at least of each of said side panels and through openings formed in said top panels.

each of said stacking tabs being bolstered for rigidity as a result of said contact of said inner walls of said side panels with the opposite end edges of said separate end panels,

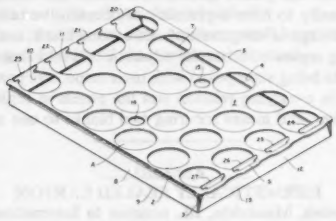
and the end walls of each of said side panels having cut-out areas corresponding with said stacking tabs and positioned at the bottom corners of said body wrap whereby the stacking tabs of said carton will mate with similar cut-but areas in a second similar carton to be stacked thereupon to essentially prevent said second carton from shifting relative to the body wrap of said carton.

4,053,099

ARTICLE TRAY

Joseph H. Lock, Mableton, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Oct. 4, 1976, Ser. No. 729,357
Int. Cl.² B65D *5/30*
U.S. Cl. 229—28 R **14 Claims**



1. An article tray comprising a bottom wall, a top wall disposed parallel to said bottom wall, a pair of spaced side walls disposed perpendicular to said top and bottom walls, a pair of end panels foldably joined respectively to the end edges of said bottom wall, at least one aperture formed in said top wall and having a locking surface disposed on the periphery of said aperture generally adjacent and parallel to the end edge of said top wall at one end of the tray, a stabilizing tab formed on the upper edge of the end panel at said one end of the tray adjacent said aperture and disposed in abutting engagement with the underside of said top wall, a locking tab formed on the upper edge of said end panel at said one end of the tray and disposed within said aperture and in abutting engagement with said locking surface, and a first shoulder formed on said locking tab and disposed in overlapping abutting relationship with the topside of said top wall, the lower edge of said shoulder at the point of contact with said top wall being disposed generally in the same horizontal plane as the upper edge of said stabilizing tab to cause a tension force across at least a portion of said end edge of said top wall at said one end of the tray.

4,053,100

SHIPPING CARTON

Brian Kent Baptist, San Jose, Calif., assignor to International Paper Company, New York, N.Y.

Filed Sept. 1, 1976, Ser. No. 719,410
Int. Cl.² B65D *5/22, 5/30*
U.S. Cl. 229—43 **5 Claims**

1. A shipping carton adapted for storage and transport of produce under cold and humid conditions comprising a tray and a separate cover adapted to fit over the top of the tray to close the carton,

said tray comprising:

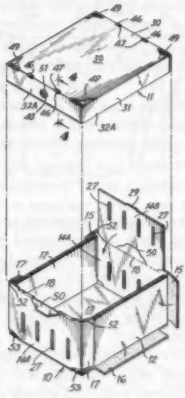
a rectangular botton panel,

a pair of double-wall end panels each comprising an outer wall integrally connected with one of the opposite ends of the bottom panel by a fold line along which said outer wall is folded to extend vertically upward from said bottom panel and an inner wall connected with said outer wall by a fold line defining the upper margin of said end panel and along which said inner wall is folded inwardly of said tray to lie substantially in face-to-face contact with the inner surface of said outer wall,

a pair of substantially rigid side panels separate from the bottom and end panels and each comprising a plurality of adhesively united corrugated mediums and facing boards,

a pair of bottom panel flaps each integrally connected with one side margin of said bottom panel by a fold line along which said flap is folded upwardly to lie upon the outer surface of one of said separate side panels thus to secure said bottom panel to both of said side panels with said side panels extending vertically upwardly from said bottom panel,

four end panel flaps each integrally connected with one vertically extending side margin of each of said outer walls of said double-wall end panels by a fold line along which said flap is folded to lie upon the outer surface of one of said separate side panels with the inner surface of the inner wall of the adjacent double-wall end panel extending in contact with the adjacent end margin of said side panel thus to secure said outer walls of each of said double-wall end panels to opposite ends of both of said side panels,



each of said four end panel flaps extending vertically in secured contact with the adjacent end of one of said side panels from substantially the level of said bottom panel to the top margin of said side panel,

and stacking tabs extending upwardly from at least two diagonally opposite top corners of said tray each of said stacking tabs being formed integrally with and extending jointly upwardly from an end panel flap and an adjacent portion of an outer wall of said double-wall end panels,

each of said stacking tabs being V-shaped and being bolstered for rigidity by the inner walls of said end panels and by the opposite ends of said separate side panels,

the outer walls only of each of said double-wall end panels and each of said four end panel flaps connected therewith having cut-out areas corresponding with said stacking tabs and positioned at the bottom corners of said tray whereby the stacking tabs of said tray will mate with similar cut-out areas in a second similar tray to be stacked thereupon, and

said cover comprising;

portions defining openings through which said stacking tabs extend when the carton is closed whereby the bottom panel of a second similar carton stacked on the closed carton rests upon the top of said cover of said

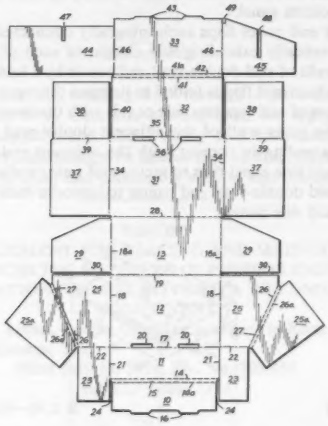
closed carton and lies between said diagonally opposed stacking tabs of said closed carton to essentially prevent said second carton from shifting relative to the tray of said closed carton.

4,053,101

COMBINATION SHIPPING CONTAINER AND DISPLAY BOX

John J. Hart, Jr., Geneva, N.Y., assignor to International Paper Company, New York, N.Y.

Filed Oct. 5, 1976, Ser. No. 729,637
Int. Cl.² B65D 5/22, 5/46
U.S. Cl. 229—36 **7 Claims**



1. A combination shipping container and display box formed from a single-piece blank of corrugated board, comprising:

a. A compartmented display box portion defined by a substantially rectangular bottom panel having two opposed side walls, a front wall, and a rear wall, said side walls and said front wall being comprised of a plurality of layers of said corrugated board;

b. a separable cover section being defined by a substantially rectangular top panel having two opposed side walls, a cover section front wall, and a back wall including hinged connecting means for connection thereof and separation therefrom of said cover section from said rear wall of said display box portion, said side walls and said cover section front wall being comprised of a plurality of layers of said corrugated board, said cover section front wall overlapping said front wall of said display portion;

intersecting divider walls which form a plurality of compartments in said display box portion, said divider walls being integral with an obtained from said back wall of said cover section to which it is detachably connected in said single-piece blank of corrugated board; and

d. hinged connecting means including a fold line sufficiently weakened to enable separation of said cover section from said display box portion.

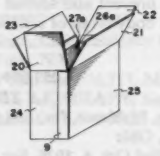
4,053,102

REINFORCED PAPERBOARD CAN

Martin H. Stark, Saginaw, Mich., assignor to Arrow Paper Products Company, Saginaw, Mich.

Filed Sept. 17, 1976, Ser. No. 724,465
Int. Cl.² B65D 5/02
U.S. Cl. 229—37 E **11 Claims**

1. Structure for forming a reinforced paperboard can comprising a first rectangular paperboard blank scored transversely to form a plurality of side-by-side panels and scored longitudinally to form a plurality of coextensive flaps at least along one edge of said panels, each of said flaps being separated from the adjacent flap by a slit; a second rectangular paperboard blank having a length corresponding to the length of said first blank and a width less than that of said first blank, said blanks being of substantially uniform thickness, said second blank being scored transversely to form a plurality of side-by-side panels corresponding in number and area to the number



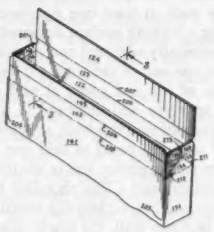
and area of the panels of said first blank and being scored longitudinally to form a plurality of coextensive tabs at least along one edge of the panels of said second blank, each of said tabs being separated from the adjacent tab, said first and second blanks being superposed with their respective panels, flaps and tabs in overlying relation and the panels in register with one another; and means securing said blanks to one another.

4,053,103

HERMETICALLY SEALED CARTON

Paul Gaudish, Mundelein, Ill., assignor to International Paper Company, New York, N.Y.

Filed Sept. 22, 1976, Ser. No. 725,897
Int. Cl.² B65D 5/02
U.S. Cl. 229—37 R **6 Claims**



1. A container closure, including:

a. a body portion comprising first, second, third and fourth foldably connected body panels, and a sealing flap foldably connected to said fourth body panel, the outer surface of said sealing flap being sealed to the inner surface of said first body panel;

b. said closure having first and second triangular end panels foldably connected to said first and third body panels as extensions thereof, and first and second roof panels foldably connected to said second and fourth body panels as extensions thereof;

c. said first triangular end panel connected to said first and second roof panels by a first pair of triangular fold-out panels extending therefrom;

d. said second triangular end panel connected to said first and second roof panels by a second pair of triangular fold-out panels extending therefrom;

e. said closure also having a side roof flap foldably connected to said sealing flap, the outer surface of said side roof flap being sealed to the inner surfaces of the extensions of said first body panel;

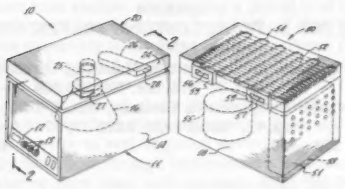
f. said first pair of triangular fold-out panels having first and second rib panels foldably connected thereto;
g. said first roof panel having a third rib panel foldably connected thereto;
h. said second pair of triangular fold-out panels having fourth and fifth rib panels foldably connected thereto;
i. said second roof panel having a sixth rib panel foldably connected thereto;
j. said side roof flap having a seventh rib panel foldably connected thereto;
k. consecutively numbered rib panels being foldably connected to one another, and the outer surface of said seventh rib panel being sealed to the inner surface of said first rib panel;
l. said roof panels extending across an end of said body portion;
m. said triangular end panels extending outward beyond said body to form projecting wings;
n. said triangular fold-out panels overlying said triangular end panels;
o. the inner surfaces of said second, third and fourth rib panels being sealed to the inner surfaces of said seventh, sixth, and fifth rib panels, respectively;

whereby a continuous and uninterrupted hermetic closure extending the width of the container is formed.

4,053,104
SELF COOLING TABLE TOP CENTRIFUGE

Harry Aron Penhasi, Cupertino, and John Francis Whiting Robbins, Los Altos, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Feb. 23, 1976, Ser. No. 660,446
Int. Cl.² B04B 7/02, 15/02
U.S. Cl. 233—11 13 Claims

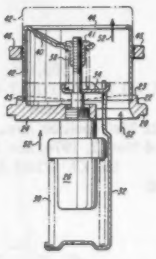


1. In a centrifuge including a rotor and a housing defining a chamber of said rotor, the improvement comprising:
a refrigeration unit having a cold air outlet and a warm air inlet to the evaporator of said unit;
first and second passageways extending through said centrifuge housing, first ends of said first and second passageways terminating external to said chamber and being adapted to be connected to said cold air outlet and warm air inlet, respectively, of said refrigeration unit, the second end of said first passageway terminating internally of said chamber, adjacent the axis of rotation of said rotor, the second end of said second passageway terminating internally of said chamber, adjacent the periphery thereof, said rotor conducting air from said first passageway to said second passageway via said chamber.

4,053,105
THERMOSTATIC VALVE DEVICE HAVING NON-LINEAR FLOW CHARACTERISTICS

Backman Wong, Wayland, and Earl L. Wilson, Wellesley, both of Mass., assignors to Standard-Thomson Corporation, Waltham, Mass.

Continuation-in-part of Ser. No. 384,519, Aug. 1, 1973, Pat. No. 3,893,618. This application June 18, 1975, Ser. No. 587,915
The portion of the term of this patent subsequent to July 8, 1992, has been disclaimed.
Int. Cl.² G05D 23/02
U.S. Cl. 236—100 7 Claims



1. A thermally responsive fluid flow control valve device for elimination of temperature fluctuations in the fluid during initial opening operation comprising:
a stationary valve member having an annular valve seat portion forming a fluid port,
a movable valve member having a closure portion engageable with the annular valve seat portion to close the fluid port, the movable valve member being movable to move the closure portion toward and away from the valve seat portion of the stationary valve member,
the stationary valve member having an annular flange encompassing the valve seat portion and forming a recess within which the annular valve seat portion is located and within which the closure portion of the movable valve member is movable, the annular flange having a sloping part, initial movement of the movable valve member with respect to the stationary valve member thus creating a small fluid flow passage between the flange and the movable valve member, and increased movement of the closure portion of the movable valve member adjacent the annular flange being non-linear in magnitude with respect to the area of the fluid flow passage created between the annular flange and the movable valve member,
thermally responsive actuator means,
means joining the thermally responsive actuator means to the movable valve member for movement thereof.

7. A thermally responsive fluid flow control valve device for elimination of temperature fluctuation in the fluid during initial opening operation comprising:
a stationary valve member having an annular valve seat portion forming a fluid port,
a movable valve member having a closure portion engageable with the valve seat portion to close the fluid port,
said portions of the valve members being in overlapping relationship, said portion of one of said valve members having an inclined wall surface which extends from the annular valve seat portion, initial movement of the movable valve member in a direction away from the stationary valve member thus creating a small fluid flow passage between said portions of the valve members and increased movement of the movable valve member in a direction from the stationary valve member being non-linear in magnitude with respect to the magnitude of the fluid flow passage created between the said portions of the valve members,
thermally responsive actuator means,

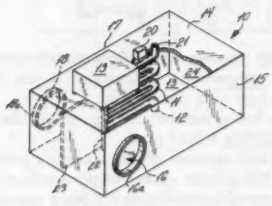
means joining the thermally responsive actuator means to the movable valve member for movement thereof.

4,053,106

SYSTEM FOR UTILIZING HEAT CONTAINED IN FLUE GAS

Robert Karl, 97-22 Metropolitan Ave., Forest Hills, N.Y. 11375

Filed Nov. 2, 1976, Ser. No. 737,938
Int. Cl.² F24D *3/00*
U.S. Cl. 237—8 R **1 Claim**



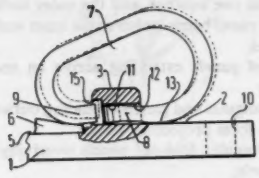
1. In combination with a heating system comprising a boiler, combustion means for heating water contained in the boiler and a flue for conducting away hot gases resulting from the combustion, the invention comprising a system for recovering heat contained in the flue gas comprising a housing having a flue gas inlet and a flue gas outlet in direct opposition to the flue gas inlet, a first path from the flue gas inlet to the flue gas outlet being defined by the shortest distance between the flue gas inlet and the flue gas outlet, contained in the housing laterally offset from and immediately adjacent said first path a coil having a water inlet and a water outlet, a second, longer path from the flue gas inlet to the flue gas outlet intersecting said coil, laterally offset from and immediately adjacent said coil an unobstructed space in said housing, a third, longest path from the flue gas inlet to the flue gas outlet including said unobstructed space, sole means for directing the flow of flue gas, said flue gas directing means comprising a directing plate pivotally mounted for movement between a first position in which it blocks the first path and a second position in which it blocks the second path, means for sensing the temperature of water heated in the coil by the flue gas, a motor operatively connected to said directing plate for pivoting said directing plate back and forth between said first and second positions and means for actuating the motor in response to the temperature sensed by the sensing means, whereby the directing plate is pivoted into the first position when the temperature of the water in the coil is below a desired level and the flue gas is thereby directed into the second path to further heat the water in the coil, the directing plate is pivoted into the second position when the temperature of the water in the coil is above a desired level and the flue gas is thereby directed into the first path to permit the water in the coil to cool and the third path permits the flue gas to flow from the flue gas inlet to the flue gas outlet in the event that the directing plate is in the first position and the second path becomes obstructed such as by the accumulation of soot in the interstices of the coil.

4,053,107

DEVICE FOR FASTENING A RAIL TO A SLEEPER, HOLDER AND CLIP FOR THE APPLICATION OF SUCH A FASTENING DEVICE

Lodewijk Goderbauer, van Lommessenweg 1, Schaesberg, Netherlands

Filed Mar. 17, 1976, Ser. No. 667,698
Claims priority, application Netherlands, Mar. 24, 1975, 7503503
Int. Cl.² E01B *9/30, 9/34, 9/48*
U.S. Cl. 238—349 **18 Claims**



1. A device for fastening a rail to a cross tie, comprising in combination:

a holder adapted to be secured to a cross tie, said holder having a portion for underlying a rail foot and an upstanding portion adjacent the rail foot, said upstanding portion defining a recess facing the rail and a recess facing away from the rail; and

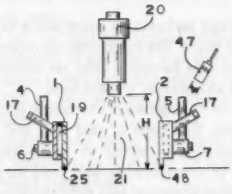
a spring clip cooperating with said holder to press downwardly on the rail foot, said clip comprising first and second C-shaped portions disposed in spaced, side-by-side upstanding relation, and a bight portion joining such C-shaped portions at one of their ends so as to leave the opposite ends of said C-shaped portions free, said free ends of the C-shaped portions being directed toward but spaced from said bight portion with such spacing being less than the width of the upstanding portion of said holder, and said free ends being received in that recess adjacent the rail foot and extending outwardly therefrom to bear downwardly upon the rail foot while said bight portion is received in the other recess, said recess adjacent the rail foot being of a height which provides clearance over said free ends whereby said free ends may be deformed upwardly only to a limited extent.

4,053,108

DEVICE FOR LATERAL LIMITING TRAFFIC MARKING LINES

Walter Hofmann, An der Flottbek, Hamburg, Germany (2000)

Filed Oct. 7, 1976, Ser. No. 730,569
Claims priority, application Germany, Oct. 4, 1975, 2544478
Int. Cl.² B05B *1/28;* B28B *19/00*
U.S. Cl. 239—150 **10 Claims**



1. Apparatus for applying road marking lines onto a roadway and limiting the lateral extent thereof and thereby control the width and edge finish of the lines, comprising:

a frame;

an adjustable spray gun operatively associated with said

frame for applying spray road marking indicia material onto the roadway;

a pair of oppositely disposed sliding plates coupled to said frame, said plates being positioned on opposite sides of said spray gun and laterally separated in distance in accordance with the width of the lines to be marked on the roadway, said plates being adjustable laterally to vary the lateral spacing therebetween to vary the width of the lines to be marked, said plates being slidable on the roadway in contact therewith to assure obtention of a fine edge for the road marking; and

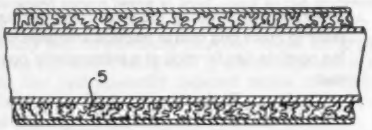
gas supply devices connected with said sliding plates for supplying blowing gas for blowing the spray road marking indicia material away from said sliding plates and onto the roadway between said sliding plates and onto the marking lines.

4,053,109

WATER CONDUCTING AND EMITTING DEVICE

Gideon Gilead, 5 Nicaragua Street, Jerusalem, Israel

Filed Feb. 5, 1976, Ser. No. 655,487
Claims priority, application Israel, Feb. 25, 1975, 46706
Int. Cl.[2] B05B *15/00*
U.S. Cl. 239—542 **11 Claims**



1. An irrigation device comprising:

an inner elongated continuous hollow hose element for conveying fluid through the interior thereof;

an outer elongated continuous hose element coaxial with and external of said inner hose element; and

a fluid conduit formed in the space between the outer surface of said inner hose element and the inner surface of said outer hose element, said conduit having a non-helical pattern in said irrigation device and extending in a generally longitudinal fashion, said conduit being formed by pressing undulations into the wall of one of said inner and outer hose elements thereby placing said hose walls in contact at various locations depending upon the pattern of said undulations;

said inner hose element wall having a plurality of openings therethrough spaced along the length of said irrigation device to provide fluid communication between the interior thereof and said conduit;

said outer hose element wall having a plurality of openings therethrough spaced along the length of said irrigation device to provide fluid communication from said conduit to the exterior of said irrigation device;

whereby fluid flow through said conduit is non-laminar and trickles or drips from said openings along the length of said outer hose element.

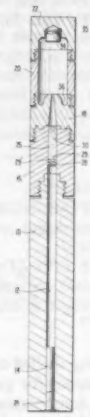
4,053,110

SHOCK PRESS

Samuel Schalkowsky, Chevy Chase, Md., and Louis L. Clipp, McLean, Va., assignors to Exotech, Incorporated, Gaithersburg, Md.

Filed Apr. 1, 1976, Ser. No. 672,713
Int. Cl.[2] B02C *19/18*
U.S. Cl. 241—1 **10 Claims**

1. An instrument for applying controlled high pressures to a sample with little temperature rise in the sample comprising barrel means containing a bore, a free-moving piston arranged in said bore, said bore forming an acceleration path for said piston, sample holding means attached to one end of said barrel and having a sample holding bore adapted to contain said sample aligned with said bore in the barrel and forming a part of the piston acceleration path such that said piston can strike the sample at one end of its travel along said acceleration path, nozzle means attached to said sample holding means and having a nozzle connected with said sample holding bore, end cap means spaced from the exit of said nozzle and forming a chamber at the exit of said nozzle, means for accelerating said piston along said acceleration path to strike the sample and create a shock wave in said sample to force a portion of the sample through the nozzle as a high velocity jet into said chamber, and collecting means for collecting said portion of the sample in said chamber.

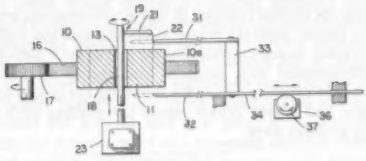


4,053,111

APPARATUS AND METHOD FOR PRODUCING DISTRIBUTED STATOR WINDINGS

Robert J. Eminger, Fort Wayne, Ind., assignor to Windamatic Systems, Inc., Fort Wayne, Ind.

Filed Dec. 6, 1976, Ser. No. 747,885
Int. Cl.[2] B65H *81/06*; H01F *7/06*
U.S. Cl. 242—1.1 R **11 Claims**



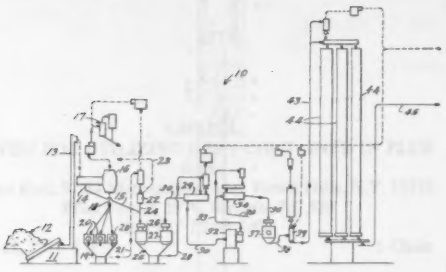
1. A stator winding apparatus for placing a winding of varying depth along the length of radially inwardly extending teeth or pole cores of a stator, the stator having a cylindrical configuration with radial teeth extending inwardly to define a central bore, said apparatus comprising a winding head actuated through said central bore and having a wire-dispensing member moved in a path sequentially parallel to and transverse to the axis of the stator bore and encircling the base of the stator tooth receiving the winding, winding turn distributing elements movably supported outboard of the stator adjacent the end faces thereof, said distributing elements being movable radially inward between said path of the wire-dispensing member and the stator tooth receiving the winding, and means for moving said distributing elements radially inward with respect to the stator in a series of reciprocating strokes of decreasing length as said head moves through its winding path to thereby distribute the windings in increasing depth toward the base of the tooth receiving the winding.

4,053,112

CORN COB PROCESSING APPARATUS AND METHOD

David I. B. Vander Hooven, Maumee; Jacobus Johan Van der Zwan, Holland; James L. Logston, Perrysburg, and Carl E. Pennington, Swanton, all of Ohio, assignors to The Andersons, Maumee, Ohio

Filed Dec. 13, 1973, Ser. No. 424,369
Int. Cl.[2] B02C 7/00, 17/02, 13/00; B02B 5/02
U.S. Cl. 241—24 12 Claims



1. Apparatus for processing shelled corn cobs comprising, in combination, first grader means for grading the shelled corn cobs and removing lighter components, first aspirating means in communication with said first grader means for removing husks from the corn cobs, crusher means communicating with said first aspirating means for reducing the size of the corn cobs to between ¼ inch and 3inches in length, said crusher means comprising a revolving cylinder crusher, second aspirating means in communication with said crusher means for removing any remaining husks from the corn cobs, hammer mill means in communication with said second aspirating means for reducing the corn cobs into ⅜ inch to ¼ inch pieces, second grader means in communication with said hammer mill means for grading said pieces to a first predetermined size, wherein pieces over such size are returned to said hammer mill means, cob drier means for receiving corn cob pieces under such first predetermined size and drying such pieces to a predetermined moisture content, third grader means for removing corn cob pieces under a second predetermined size, attrition mill means for receiving corn cob pieces over such second predetermined size and reducing such pieces to a third predetermined size, third aspirating means in communication with said attrition mill means for further removal of lighter components and dust from such pieces, shearing means in communication with said third aspirating means for reducing the size of such pieces to a fourth predetermined size, attrition mill means in communication with said shearing means for rounding the pieces to a granular shape, and fourth grader means for grading such pieces into final product sizes.

4,053,113

DRY GRINDING PROCESS FOR REDUCING ORE TO PELLETIZABLE PARTICLES

Friedrich Rosenstock; Walter Hastik, both of Frankfurt am Main, and Reinhold Becker, Bad Homburg, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Sept. 24, 1976, Ser. No. 726,486
Claims priority, application Germany, Oct. 10, 1975, 2545424
Int. Cl.[2] B02C 23/12
U.S. Cl. 241—30 4 Claims

1. A process for dry grinding ore to produce pelletizable particles which comprises the steps of:

a. grinding ore in a size-reducing unit;

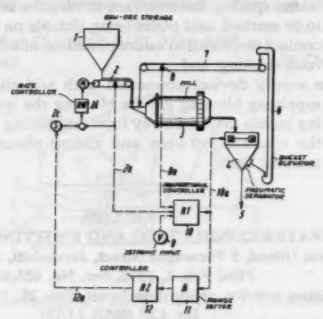
b. classifying the ground ore in a centrifugal pneumatic separator into a coarse fraction and a fine fraction, said centrifugal pneumatic separator having a controllable operating parameter;

c. recycling the coarse fraction into the size-reducing unit;

d. discharging the fine fraction as a finished product; and

e. maintaining a substantially constant total rate of ore feed and recycled coarse fraction feed to said size-reducing unit by

maintaining the ratio of the ore-feed rate to the coarse fraction recycled rate substantially constant,



automatically controlling the centrifugal pneumatic separator to make said coarse fraction available with a varying particle size fraction at a substantially constant rate, and

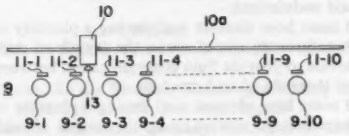
varying the ore-feed rate when and only when, said controllable variable of the pneumatic separator has a deviation in excess of a predetermined permissible deviation.

4,053,114

METHOD AND APPARATUS FOR COUNTING YARN-SPLICING OPERATIONS OF SPINDLES IN AUTOMATIC WINDING MACHINE

Takao Miyake, Neyagawa, and Katsue Koashi, Toyonaka, both of Japan, assignors to Kurashiki Boseki Kabushiki Kaisha, Japan

Filed Oct. 18, 1976, Ser. No. 733,190
Claims priority, application Japan, Oct. 20, 1975, 50-126592
Int. Cl.[2] B65H 63/00, 69/02, 69/04
U.S. Cl. 242—36 3 Claims



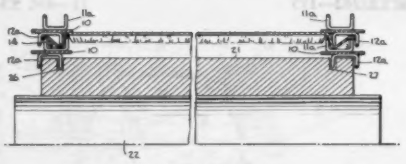
1. A method for counting yarn splicing operations for each of the spindles in an automatic winding machine provided with a plurality of winding spindles and an automatic knotting machine and in which relative motion of said spindles and said knotting machine causes the knotting machine and successive spindles to be adjacent each other for carrying out a yarn splicing operation when necessary, said method comprising generating a pulse signal each time the knotting machine and a spindle are adjacent each other during the relative motion of the knotting machine and the spindles, the pulse being of relatively short duration when said knotting machine is adjacent a spindle for a time insufficient to carry out a splicing operation and being of relatively long duration when said knotting machine is adjacent a spindle for a time sufficient to carry out a splcng operation, discriminating between said long and short duration pulses for each spindle, and counting the long duration pulses for each spindle as an indication of the occurrances of a splicing operation for that spindle.

4,053,115

FABRIC PROTECTING MEANS

Herbert Schmitz, Kitchener, Canada, assignor to Uniroyal Ltd., Ontario, Canada

Continuation-in-part of Ser. No. 506,081, Sept. 16, 1974, abandoned. This application Apr. 15, 1976, Ser. No. 677,201
Claims priority, application Canada, Aug. 15, 1974, 207103
Int. Cl.[2] B65H *75/02, 75/28*
U.S. Cl. 242—77.1 30 Claims



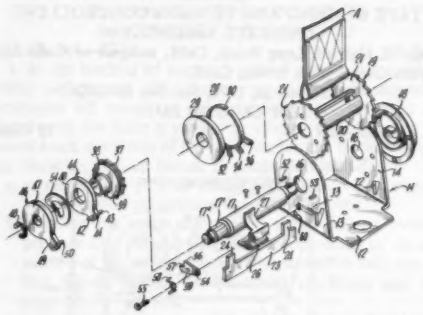
1. A fabric protecting means for collecting, shipping and storing fabric, comprising an elongate, flexible carrier strip, upwardly disposed means integral with said carrier strip for gripping and engaging said fabric, and downwardly disposed means integral with said carrier strip for gripping and engaging said fabric, the height of each of said upwardly and downwardly disposed means being at least equal to the thickness of said fabric, and said carrier strip being sufficiently long and said upwardly and downwardly disposed means for gripping and engaging said fabric being closely spaced adjacent to each other such that said upwardly disposed means mechanically grips and engages said fabric with said downwardly disposed means upon being placed into contact with said fabric in a rolled, wrapped configuration in all successive wraps of said fabric.

4,053,116

RETRACTION LOCKING SAFETY BELT RETRACTOR

Juichiro Takada, Tokyo, Japan, assignor to Takata Kojyo Co., Ltd., Tokyo, Japan

Filed May 21, 1976, Ser. No. 688,661
Int. Cl.[2] A62B *35/00;* B65H *75/48*
U.S. Cl. 242—107.7 6 Claims



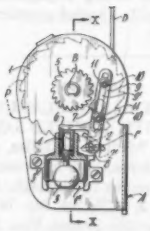
1. A belt retractor device comprising a reel rotatable in opposite belt retraction and extraction directions, a belt coupled to said reel and windable thereon with the belt retraction rotation thereof, spring means biasing said reel in the belt retraction rotation thereof, a ratchet wheel rotatable with said reel, a pawl member swingable between an advance position engaging said ratchet wheel and locking said reel against retraction rotation and a retracted position disengaging said ratchet wheel and having a lock shoulder and a cam edge, spring means biasing said pawl member toward its advance position, an actuator member rotatable through a restricted angle about the axis of said reel and slip drive coupled thereto, a follower element defining projection projecting transversely from and eccentrically located on said actuator member and movable in engagement with said cam surface to retract said pawl member with the extraction rotation of said reel, a locking member rotatable through a restricted angle about the axis of said reel and drive coupled thereto, a locking element defining projection located eccentrically on and projecting transversely from said locking member and movable into registry with said pawl member shoulder with the retraction rotation of said reel and a release element defining projection eccentrically located on and projecting from said actuator member and movable into engagement with said locking member with the extraction rotation of said reel to retract said locking element from said pawl lock shoulder to permit the spring advance of said pawl into engagement with said ratchet wheel.

4,053,117

AUTOMATIC LOCKING SAFETY BELT RETRACTOR

Juichiro Takada, Tokyo, Japan, assignor to Takata Kojyo Co., Ltd., Tokyo, Japan

Filed May 13, 1976, Ser. No. 685,967
Claims priority, application Japan, May 17, 1975, 50-057929
Int. Cl.[2] A62B *35/02;* B65H *75/48*
U.S. Cl. 242—107.4 A 9 Claims



1. A safety belt retractor device comprising a belt take-up reel rotatable in opposite belt extraction and belt retraction directions and spring biased to rotate in a belt retraction direction, a first ratchet wheel coaxially rotatable with said reel, a first pawl member movable between a retracted position disengaged from said first ratchet wheel and an advanced position engaging said first ratchet wheel, a peripherally toothed drive wheel coaxially rotatable with said reel, an actuating member including a drive wheel engaging coupling element, means mounting said actuating member for sliding movement along a path proximate the periphery of said drive wheel between a retracted position with said coupling element out of engagement with said drive wheel, an intermediate position with said coupling element engaging said drive wheel and an advanced position, means for moving said first pawl to its advanced position with the movement of said actuating member toward its advanced position and means for moving said actuator member to its intermediate position in response to a predetermined acceleration of said retractor.

4,053,118

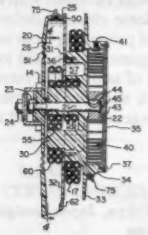
REVERSIBLE REEL UNIT

Warren A. Aikins, Longview, Wash., assignor to Swing-Shift Mfg. Co., Rainier, Oreg.

Filed May 21, 1976, Ser. No. 688,782
Int. Cl.[2] B65H *75/38, 75/48*
U.S. Cl. 242—107.11 11 Claims

1. A reel unit for a flexible line such as a hose line or electric cord line, comprising a stationary housing having a closed side and an open side, a stationary shaft mounted at one end in said closed side of said housing and having an opposite and extending out of said open side, and a rotary member mounted for rotation on said shaft; said rotary member comprising a reel having a reel hub outside of said housing, a first radial reel flange on said hub adjacent said open side of said housing, and

a second radial reel flange on said hub spaced away from said housing; an axial circular flange outstanding from the outside surface of said second reel flange, said second reel flange and axial circular flange defining a spring housing, a flat spiral power spring in said spring housing having an inner end connected to said shaft and an outer end connected to said spring



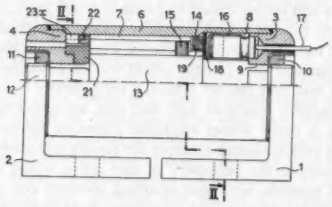
housing; a counterwind hub extension on said reel hub extending into said stationary housing, and grooves in said hub and hub extension for leading said line from said hub extension to a winding surface on said hub; said stationary housing having a peripheral sealing lip in sliding engagement with said first radial reel flange to provide a sealed counterwind chamber for said line in said housing.

4,053,119

WINDING DEVICE PARTICULARLY USEFUL IN CONNECTION WITH VEHICLE SAFETY BELTS

Bernard J. Doin, Saint Medard en Jalles, and Jean-Francois Tillac, Bordeaux Cauderan, both of France, assignors to Societe Nationale des Poudres et Explosifs, France

Filed Dec. 3, 1976, Ser. No. 747,402
Claims priority, application France, Dec. 31, 1975, 75.40206
Int. Cl.[2] B65H *75/48*
U.S. Cl. 242—107.4 R **10 Claims**



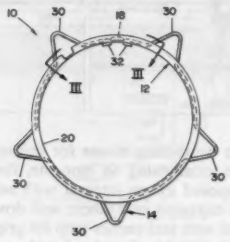
1. In a device for winding up an elongate flexible element, such as a vehicle safety belt, comprising a casing, an axle mounted in said casing and rotationally fast therewith, a hollow winding-drum rotatably mounted in said casing coaxial with and surrounding said axle, an annular piston positioned between said drum and axle and axially movable relative thereto between initial and final positions, an annular pressure chamber defined within said drum by said piston in said initial position thereof, a pyrotechnic charge for pressurising said pressure chamber with combustion gases therefrom to propel said piston axially along said drum and axle from said initial position, to said final position, first cooperable guide means on said piston and said drum, and second cooperable guide means on said piston and said axle, said first and second guide means being so arranged that said piston is rotationally fast with one of said drum and axle, and is movable along a helicoidal path relative to the other of said drum and axle, whereby axial displacement of the piston by the combustion gases causes said drum to be rotated for winding said flexible element on to said drum, the improvement which comprises the annular piston being formed by two annular half-pistons, one of said half-pistons cooperating through said first guide means with the drum, the other of said half-pistons cooperating through said second guide means with said shaft, and said half-pistons having means for interconnecting said half-pistons to move together.

4,053,120

WIRE REEL

John G. Frantzreb, Sr., Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 16, 1976, Ser. No. 649,873
Int. Cl.[2] B65H *75/22*
U.S. Cl. 242—115 **4 Claims**



1. A wire reel comprising:

an elongated member including lock means unitarily formed at the ends thereof for coupling said ends of said elongated member one to the other to form an annular core, said elongated member having unitarily formed along each elongated side a U-shaped channel;

first and second side pieces each removably received in the U-shaped channel with said elongated member formed in an annular core to form a reel therewith, each side piece defining a plurality of projections, extending radially outwardly from said elongated member while said elongated member is formed in an annular core;

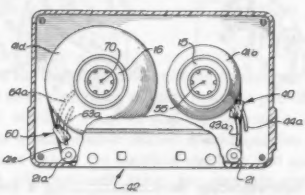
keeper means demountably affixed to said elongated member while formed in an annular core, said keeper means acting in cooperation with said side pieces for retaining said side pieces in a fixed relation relative said core.

4,053,121

TAPE GUIDING AND TENSION CONTROLLING CASSETTE ASSEMBLY

Happy H. Unfried, Long Beach, Calif., assignor to Audio Magnetics Corporation, Irvine, Calif.

Filed June 21, 1976, Ser. No. 698,282
Int. Cl.[2] G11B *23/10*
U.S. Cl. 242—199 **15 Claims**



15. In a tape cassette assembly having a case and a first rotatable tape reel within the case, the reel having an axis of rotation and the tape adapted to form a pack on the reel,

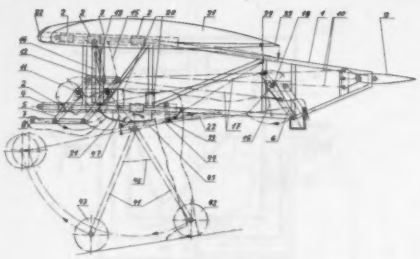
a. a first tape follower bodily movable within the case to guide the tape approaching the tape pack on the reel,

b. a non-rotatable tape director carried by the case to turn the tape and direct it toward the follower, and

c. guide means including a pair of arcuate guide tracks carried by the case to interfit the follower, and along which the follower is movable to bodily rotate in response to such movement,

d. the case having opposite side walls, and said pair of tracks located on one of said walls.

4,053,122
FLAPPING WING AIRCRAFT
Konrad Gar, Haus Nr. 30, 8078 Nettelhofen, Germany
Filed Jan. 22, 1976, Ser. No. 651,528
Claims priority, application Germany, Jan. 27, 1975, 2503177
Int. Cl.[2] B64C *33/02*
U.S. Cl. 244—11 **15 Claims**



1. A flapping wing aircraft comprising an aircraft fuselage, two superposed pairs of flapping wings extending laterally from substantially in flight direction orientated bearing spars and a lever system for actuating the wings in opposite respective directions and comprising means for locking the wings in a horizontal volplane position, the lever system further comprises two mutually independent toggle lever systems for the mutually independent actuation of the wings on the right-hand and left-hand sides respectively, the wings being at least partially elastic and of a broad shape.

4,053,123
METHOD AND APPARATUS TO DETERMINE NEED FOR ROTOR BLADE PITCH ADJUSTMENT AND/OR BLADE SUBSTITUTION
James R. Chadwick, Bradbury, Calif., assignor to Chadwick-Helmuth Company, Inc., Monrovia, Calif.
Filed Apr. 16, 1976, Ser. No. 677,561
Int. Cl.[2] B64C *27/72*; G01M *1/22*
U.S. Cl. 244—17.11 **9 Claims**

1. In the method of testing a bladed rotor having multiple blades defining an axis of rotation, said rotor comprising a helicopter lift rotor and wherein helicopter structure associated with the rotor is subject to vibratory motion due to an out-of-track condition of the rotor blades, the method employing vibration pick-up means, the steps that include

a. mounting the pick-up means on the helicopter structure with longitudinal spacing from the lift rotor,

b. rotating the rotor and operating the pick-up means to produce first vibratory signals corresponding to vibratory motion of the structure generally parallel to said axis, said first signals having an associated amplitude and clock angle about said axis,

c. adjusting the effective pitch of at least one of said blades in an effort to reduce the amplitude of said vibratory signals and maintaining the adjustment constant as the rotor rotates, and

d. repeating at least said (b) step to produce second vibratory signals corresponding to vibratory motion of the structure generally parallel to said axis, said second signals having an associated amplitude and clock angle about said axis, and

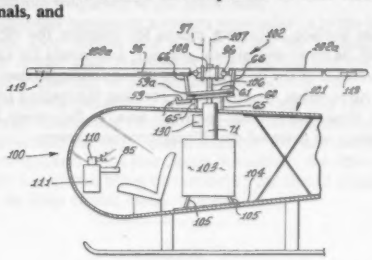
e. determining from said first and second signals amplitudes and from said clock angles a minimum or near minimum value for said vibratory signal amplitude, and which is less than each of said first and second signal amplitudes, and

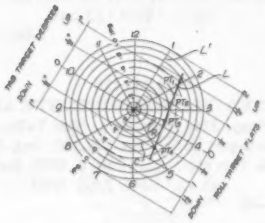
f. substituting a new blade or blades for at least one of said rotor blades if said minimum or near minimum value is unacceptably large, thereby to reduce said out-of-track condition of the rotor blades.

9. In the method of testing a bladed rotor having multiple blades defining an axis of rotation, and wherein structure associated with the rotor is subject to vibratory motion due to an out-of-track condition of the rotor blades, the method employing vibration pick-up means, carried by said structure, the steps including

a. rotating the rotor and operating the pick-up means to produce first vibratory signals corresponding to vibratory motion of the structure generally parallel to said axis,

b. adjusting the effective pitch of at least one of said blades in an effort to reduce the amplitude of said vibratory signals, and





c. repeating said (a) and (b) steps in an effort to further reduce the amplitude of said vibratory signals, said repetition being carried out to determine a minimum or near minimum value for said vibratory signal amplitude,

d. said rotor comprising a helicopter main lift rotor, and said pitch adjustment being effected by adjusting (i) the effective length of at least one pitch link connected to at least one blade, or (ii) the angularity of at least one trim tab associated with at least one blade, the selection of (i) or (ii) being determined by stroboscopically observing, for increasing forward speeds of the helicopter, the rate of rise of a cross bar target on the underside of a blade sweeping forwardly at one side of the rotor, adjustment (i) being indicated when the cross bar rises relative to a vertical bar target to another blade.

4,053,124
VARIABLE CAMBER AIRFOIL
James B. Cole, Mercer Island, Wash., assignor to The Boeing Company, Seattle, Wash.
Division of Ser. No. 607,004, Aug. 22, 1975, Pat. No. 3,994,452, which is a division of Ser. No. 455,837, March 28, 1974, Pat. No. 3,994,451. This application July 26, 1976, Ser. No. 708,671
Int. Cl.[2] B64C *3/48*
U.S. Cl. 244—219 **16 Claims**

10. A variable camber apparatus for the trailing edge portion of an airfoil, comprising: a trailing edge structure; an aerodynamically continuous upper surface having an inner-end connected to relatively rigid structure of the airfoil and an outer-

end fixedly connected to the trailing edge structure; a rib member pivotally mounted about its inner-end to an axis fixed with respect to rigid structure of the airfoil; linkage means interconnecting the trailing edge structure with the rib member such that the rib member supports the outer-end of the upper surface independently of the structural continuity of said

upper surface; actuating means for rotating the rib member about its inner end pivotal support; and means for slaving the movement of the linkage means to the rotational movement of the rib member for torsionally rotating the trailing edge structure about a relatively spanwise axis, to flexuously bend and produce an external curvilinear contour thereto.

4,053,125

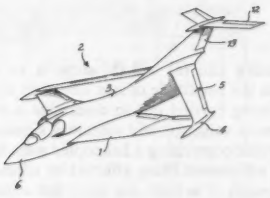
STAGGERED CHANNEL WING-TYPE AIRCRAFT

Alexander Ratony, 3264 Royal Ave., Simi Valley, Calif. 93065

Continuation-in-part of Ser. No. 393,220, Aug. 30, 1973, Pat. No. 3,981,460. This application July 6, 1976, Ser. No. 702,740

Int. Cl.[2] B64C *3/06, 3/40*

U.S. Cl. 244—46 **10 Claims**



1. A staggered channel wing-type aircraft comprising:

a fuselage with a nose, a passenger section, and an aft section;

a propulsion means coupled to said fuselage;

a pair of substantially horizontal forward wings having leading and trailing edges, said forward wings and said leading and trailing edges, thereof being swept backward from said fuselage;

a pair of sloping rearward wings having leading and trailing edges, each of said rearward wings being attached to its tip to a corresponding tip of said forward wings, said rearward wings and said leading and trailing edges thereof being swept slopingly backward to join said fuselage, each of said rearward wings, forward wings, and fuselage forming a substantially triangular-like configuration, said trailing edge of said forward wing being spaced apart forward of said leading edge of said rearward wing, except adjacent their tips;

a tail extending vertically from said aft section; and

control surfaces on said tail and on said pair of substantially horizontal forward wings.

4,053,126

HELICOPTER CABIN AND METHOD OF MAKING SAME

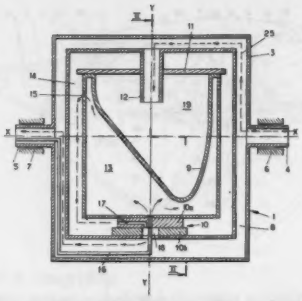
Maurice Louis Duret, Aix-en-Provence, and Pierre Barnoin, Eguilles, both of France, assignors to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed Nov. 19, 1975, Ser. No. 633,439

Claims priority, application France, Nov. 26, 1974, 74.38661

Int. Cl.[2] B64C *1/00;* **B29D** *3/00;* **B29C** *5/04*

U.S. Cl. 244—119 **9 Claims**



1. A method for making a helicopter cabin, in the form of a thin-walled hollow structure, with apertures corresponding to doors and a canopy, and having an internal floor incorporated into the structure, which comprises forming frames composed of elongated metal elements corresponding respectively to the frames of the doors and canopy and to a junction line between said floor and said structure, said frames being made of U-shaped, open channels; positioning said frames within a rotatable mold with said frames adjacent the wall thereof, disposing open sides of said U-shaped open channels toward molding surfaces of said mold; introducing a molding material into said mold, and heating and rotating said mold to cause said material to form a relatively thin shell following the contours of said mold, interconnecting said frames, and embedding at least portions of said channels in said molding material adjacent said open ends along substantially the entire length of said shell and closing said open ends of said channels with said material.

4,053,127

APPARATUS FOR INDICATING RATE OF ICE ACCRETION

Geoffrey Edgington, Godalming, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Nov. 9, 1976, Ser. No. 740,180

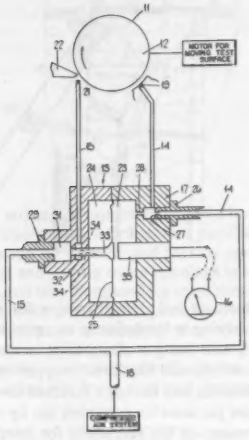
Claims priority, application United Kingdom, Nov. 19, 1975, 47592/75

Int. Cl.[2] G01B *13/04*

U.S. Cl. 244—134 F **5 Claims**

1. Apparatus for indicating rate of ice accretion on a surface, comprising a hollow housing, a resilient diaphragm dividing the housing internally into first and second chambers, a first conduit communicating at one end in use with a gas supply and terminating at its other end in a first orifice, a first restrictor intermediate the ends of the first conduit, and said first chamber communicating with said first conduit intermediate the first orifice and the first restrictor, a test surface upon which ice can form in use, means for moving the test surface past the first orifice at a known speed and at a constant spacing therefrom, a second conduit communicating at one end in use with said gas supply and terminating at its other end in a second orifice, a second restrictor intermediate the ends of the second conduit, the second restrictor being a variable restrictor the setting of which is determined by the position of the diaphragm relative to the housing, said second chamber communicating with said second conduit intermediate said second restrictor and said

second orifice, and, means for supplying a signal representative of the position of the diaphragm relative to the housing to an indicator, said second restrictor being arranged to effect a decrease in restriction in said second conduit as the diaphragm moves in a direction to reduce the volume of the second chamber, whereby when there is no ice on said test surface the diaphragm assumes a rest position from which it is moved in a direction to reduce the volume of the second chamber when



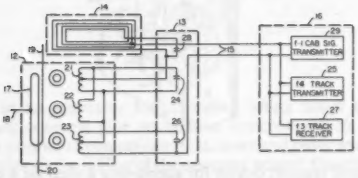
the first orifice is restricted by ice forming on the test surface, the movement of the diaphragm reducing the restricion imparted in the second conduit by the second restrictor and so increasing the pressure in the second chamber so as to establish a new equilibrium position of the diaphragm, the change in position of the diaphragm being shown by the indicator and being directly related to the rate of ice accretion on the test surface so that the indicator can be considered as indicating rate of ice accretion.

4,053,128

JOINTLESS HIGH FREQUENCY TRACK CIRCUIT SYSTEMS FOR RAILROADS

Klaus H. Frielinghaus, and Clinton S. Wilcox, both of Rochester, N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Filed Dec. 6, 1976, Ser. No. 748,024
Int. Cl.² B61L *23/22*
U.S. Cl. 246—34 R **2 Claims**



1. A jointless high frequency track circuit system, for communication of signals through track rails of a stretch of railway track, having a high frequency track circuit transmitter and receiver and a cab signal transmitter coupled across the track rails at each of several locations marking the ends of track sections along a stretch of railway track wherein improved means for coupling the transmitters and receiver to the track rails at one location comprises; .

a. impedance bond means having a low resistance primary winding shunting the track rails and providing a propulsion current return connection at its midpoint,

b. the impedance bond means having a plurality of toroid coil means inductively coupled to the primary winding for coupling a distinctive frequency transmitter and a distinctive frequency receiver to the track rails,

c. tuning means for tuning each of the toroid coil means to substantially parallel resonance for maximum impedance across the track rails,

d. loop circuit means disposed between the track rails and inductively coupled thereto along a portion extending near the impedance bond means but not inductively coupled thereto for coupling the cab signal transmitter at a distinctive frequency to the track rails,

e. an apparatus housing at a remote point relative to the bond means, loop means, and tuning means for housing the track circuit code transmitter, the receiver and the cab signal transmitter of at least said one location, and

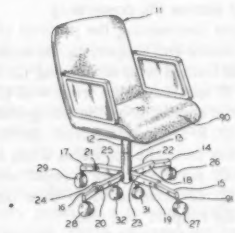
f. circuit means including a line circuit having only two line wires for connecting the track circuit code transmitter and receiver and the cab signal transmitter for said one location to one end of the line circuit in multiple, the other end of the line circuit being connected to the toroid windings and the loop circuit means in series.

4,053,129

GLIDING CHAIR SYSTEM

Vernon D. Graff, P.O. Box 1410, Edmond, Okla. 73034

Filed Nov. 29, 1976, Ser. No. 745,616
Int. Cl.² F16M *11/20*
U.S. Cl. 248—188.7 **13 Claims**



1. An improved gliding chair system comprising:

elevated sitting means for receiving a user's body;

chair support means attached to and cooperating with the lower end of said sitting means for providing support and means for mobility to said gliding chair system,

said chair support means comprising a plurality of extended leg members,

said chair support means further comprising one or more double-action lever means rotatably connected for movement in a vertical plane at a fulcrum point located a desired distance along one or more of said plurality of extended leg members respectively,

each of said lever means maintained in a fixed protruding position relative to said leg member so as to be in substantial alignment with said respective leg member whereby rotative movement of said lever means relative to said respective leg member in a substantially horizontal plane is precluded,

each of said one or more double-action lever means having outer gliding means attached by glide attachment means proximate to a first end of said lever means and inner gliding means cooperating with a second end of said lever means, and

each of said one or more double-action lever means rotating about said fulcrum connection in said extended leg member so as to distribute the weight of said user's body and said chair system through both said inner and outer gliding means, thereby reducing the force exerted by said user

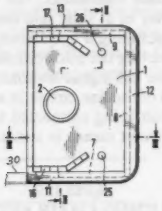
and chair at any one point on a surface and facilitating the gliding of said chair over said surface.

4,053,130

ATTACHMENT ARRANGEMENT FOR ELECTRONIC APPARATUS TO A SUPPORT WALL

Udo Birkner, Heinde, Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Germany

Filed July 6, 1976, Ser. No. 702,985
Claims priority, application Germany, July 5, 1976, 2530199
Int. Cl.² H01R *13/60, 9/16*
U.S. Cl. 248—27.3 **12 Claims**



1. Attachment arrangement for electronic apparatus (4) to a support wall (10) in which the support wall is formed with an opening to introduce the apparatus therethrough,

wherein the electronic apparatus (4) is formed with cylindrical threaded sleeves (3), comprising

a fitting element determining the position of the apparatus (4) in the opening and supporting the apparatus having

a front wall (1) formed with an opening (2) therein;

means (22; 5, 6) secured to the front wall (1) locating and supporting the apparatus on the fitting element;

wall portions (7, 8, 9) extending from the front wall in the direction away from the apparatus when located in position said wall portions being formed with turned-over edges (11, 12, 13) adapted to fit over the edges of the opening in the support wall (10);

means clamping said fitting element including at least one tapered holding element formed on the wall (1) of the fitting element having a tapered or inclined surface extending at an inclination with respect to the major plane of the front wall;

and movable housing means (20, 21) secured to the front wall (10) and having a length to extend beyond the edges (14) of the opening in the support wall and engageable with said tapered, inclined surface of the tapered holding element (16, 17), the holding means being movable within the outline of the opening to permit insertion of the fitting element and the electronic apparatus secured thereto into the opening of the support wall and then move said holding means in engagement with the rear surface of the support wall (10) and engage said holding means against the inclined surface of the tapered holding element (16, 17) to secure the fitting element against the front surface of the support wall (10) by engagement of said turned over edges (11, 12 13) and engagement of the holding means (20, 21) against the rear surface of the support wall, the holding means being positioned by the inclination or taper of the respective tapered holding element,

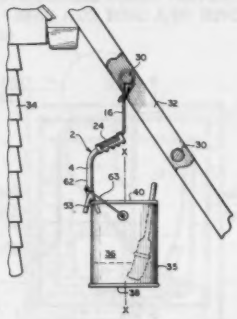
said holding means comprising wire-shaped elements having an eye at one end thereof, and the holding elements being secured to the fitting element such that the axes of the eye, and of the threaded sleeve (3) are coincident and the threaded sleeve axis forms a rotating axis for the holding element.

4,053,131

PAINT CAN HOLDER

James R. Francis, 8450 W. 95th St., Hickory Hills, Ill. 60457

Filed Mar. 29, 1976, Ser. No. 671,313
Int. Cl.² E06C *7/14*
U.S. Cl. 248—211 **12 Claims**



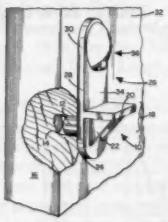
1. A quick-attach and detach hanger for a paint container and the like having a lip defining an open top and having a carrying bail, said hanger comprising a member having an upright with an inturned handle at its upper end for positioning above the container and having a furcated lower end including inner and outer portions for receiving the lip of the can therein and having means on the furcations for interlocking with the inner and outer edges of the lip, and fulcrum means on the upright intermediate its ends for engagement with the bail, said handle upon application of a lifting force thereto operative to fulcrum said hanger about said fulcrum means and loading said bail in tension and biasing said outer portion of the furcation toward said outer edge of the lip for locking engagement therewith.

4,053,132

SHELF SUPPORT

James Anthony Del Pozzo, 155 Colonel Bell Drive, Brockton, Mass. 02403

Filed Aug. 5, 1976, Ser. No. 711,773
Int. Cl.² A47B *96/06*
U.S. Cl. 248—235 **12 Claims**



1. A shelf support device for supporting a shelf on a cabinet wall, the device comprising:

a support portion having a surface for receiving a shelf edge portion;

an upright portion including a first surface for engagement with a cabinet wall, a second surface opposite said first surface, and a shelf retainer comprising a generally smoothly curved deformable web of resilient material that projects from said second surface at a location spaced apart from said support portion; and

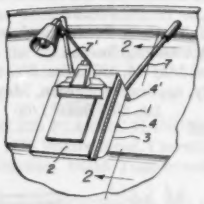
means for mounting the device on a cabinet wall.

4,053,133

PORTABLE WRITING MEANS

Robert Carl Kauffman, 342 Windemere Ave., Lansdowne, Pa. 19050

Filed May 21, 1976, Ser. No. 688,766
Int. Cl.[2] A47B 3/10
U.S. Cl. 248—452 1 Claim



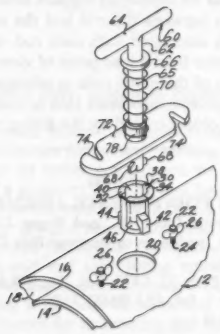
1. A portable writing device consisting of a box like member having a removable writing member, two parallel spaced members attached in spaced position and carried upon the back of the main member and having ovate openings in the upstanding portion thereof, and two elongated leg members round in cross section received in the ovate openings and provided with a pair of ring shaped elastomeric elements adapted to functionally engage the leg members and abut the ovate opening thereby forming an adjusting means whereby the device can be used in motor cars by using the front seat and instrument panel as supports.

4,053,134

PIPE MOLD HAVING INSERT SUPPORT MEANS

Bobbie D. Peacock, 702 Hippocket Road, Peachtree City, Ga. 30269

Continuation of Ser. No. 530,983, Dec. 9, 1974, abandoned. This application June 14, 1976, Ser. No. 695,914
Int. Cl.[2] B28B 23/00
U.S. Cl. 249—94 13 Claims



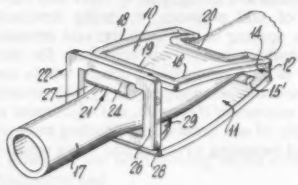
1. In an apparatus for providing lifting insert cavities in molded concrete pipe made from concrete which is poured into a pipe mold comprising rigid, inner and outer spaced shells and prior to the curing of the concrete poured therein: an inner shell and an outer shell fixed in spaced relation to each other to provide a mold in which poured concrete is placed in the space between said inner and outer shells to cure and form a rigid concrete pipe, said outer shell having at least one thru opening therein leading into the space between said inner and outer shells and receiving a cavity forming insert therethrough the cavity forming insert construction from plastic or a similar material comprising an insert body of a size smaller than the opening in the outer shell whereby said cavity forming insert is inserted thru said opening from outside after said inner and outer shells are assembled to support said insert on said outer shell and in alignment with the opening therein, said cavity forming insert having an opening in the top thereof which when in position is exposed thru the opening in said outer shell and said insert opening leading into the interior and to a closed bottom in said insert, a retaining means detachably attached to said outer shell, means on said outer shell removably attaching said retaining means to said outer shell, means on said retaining means for positioning same in said insert body prior to insertion in said opening in said outer shell for a temporary but firm engagement therewith to attach same thereto for subsequent removal therefrom after the concrete pipe is cured, and to hold same in position between said inner and outer shells whereby said insert remains inside said concrete to receive a lifting insert therein.

4,053,135

HOSE CLAMP

George P. Saliaris, Worthing, Ohio, assignor to Sigma Scientific Development, Inc., Columbus, Ohio

Filed Sept. 20, 1976, Ser. No. 724,755
Int. Cl.[2] F16K 7/06
U.S. Cl. 251—10 10 Claims



1. A unitary single-piece hose clamp of relatively stiffly compliant material, comprising first and second panels centrally interconnected at a locally relatively weak transverse hinge-axis region, said panels having a hose-admitting opening at their respective transversely central regions; one of said panels having at its opposite end an outwardly projecting auxiliary panel with a locking aperture framed by the outer confines of said auxiliary panel, said one panel being connected to said auxiliary panel at a second locally relatively weak transverse hinge-axis region, and said auxiliary panel aperture being of hose-admitting proportions, an integral bracket member relatively rigidly united to said auxiliary panel adjacent said auxiliary panel hinge-axis region and extending normal to the general plane of said framed aperture; the other of said panels having at its opposite end an outwardly projecting locking tab of width enterable in said locking aperture and relatively rigidly united to said other panel, said tab extending from said central hinge-axis region a distance greater than the distance of the near side of said locking aperture and less than the distance of the remote side of said locking aperture, said last two distances being taken from said central hinge-axis region when said frame is relatively flat with respect to said other panel; whereby a flexible hose inserted through said opening and aperture and arched over said bracket will by the nature of its stiffness tend to upwardly bend said auxiliary panel about the second hinge axis to a moderately elevated position; and whereby upon flexing said panels about the central hinge axis, the confines of the central opening will compress the hose with substantial mechanical advantage as said locking tab approaches the locking aperture; and further whereby upon subsequent hose-compressing pressure applied by squeezing together the locking ends of said panel, the hose will bear against said bracket to further angularly elevate said locking panel into resiliently loaded end abutment with said locking tab until said locking tab clears the adjacent edge of the locking aperture to permit the final resiliently loaded angular displacement of said auxiliary panel into locked retaining engagement with said tab.

4,053,136

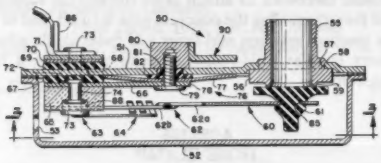
CONTROL CIRCUIT AND ADJUSTABLE VALVE FOR A GAS APPLIANCE

Richard L. Perl, Mansfield, Ohio, assignor to The Tappan Company, Mansfield, Ohio

Division of Ser. No. 583,985, June 5, 1975, Pat. No. 3,981,674. This application Jan. 29, 1976, Ser. No. 653,478

Int. Cl.² F16K *31/04*

U.S. Cl. 251—11 **22 Claims**



1. A fluid valve, comprising a fluid-tight housing having an inlet and an outlet, a valve element in said housing movable between respective positions to open and to close said outlet, a valve actuator normally maintaining said valve element in one of said positions and energizable to move said valve element to the other of said positions, mounting structure extending through an opening in said housing, said mounting structure including resilient seal means providing for limited pivotal movement of said mounting structure within such opening, said valve actuator being supported by said mounting structure for pivotal movement therewith, and adjustment means operable exteriorly of said housing for effecting such pivotal movement of said mounting structure and valve actuator supported thereby.

4,053,137

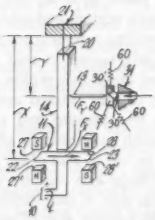
ELECTROMECHANICALLY OPERATED VALVE

Robert E. Raymond, Zanesville, Ohio, assignor to De Laval Turbine Inc., Princeton, N.J.

Filed Jan. 16, 1976, Ser. No. 649,657

Int. Cl.² F16K *31/08, 31/10*

U.S. Cl. 251—65 **13 Claims**



1. Electromechanically operated valve structure, comprising a valve body having a passage for pressure fluid flow, a movable ball-poppet valve member for controlling said flow, a valve-member suspension comprising at least three like radially extending coil springs angularly spaced about the axis of valve-member movement, the inner ends of said springs being connected to said valve member and the outer ends of said springs being fixed, and actuating means for said valve member; said actuating means comprising magnetic-core means establishing two spaced substantially parallel gaps which are directionally polarized in opposite directions, an electrically conductive coil having a course defining two substantially parallel legs that are spaced substantially in accordance with the spacing of said gaps, means including a compliantly suspended beam movably mounting and orienting said coil with respect to said core means such that each of said legs is positioned with clearance within and substantially parallel to a different one of said gaps, said mounting means constraining and guiding said coil for movement which is substantially in the plane of said legs and normal to the orientation of said legs, said valve member being so connected to said mounting means that said flow is controlled in response to excitation of said coil.

4,053,138

METHOD OF LIFTING OR LOWERING AN OBJECT BY MEANS OF A PLURALITY OF SO-CALLED CLIMBING JACKS

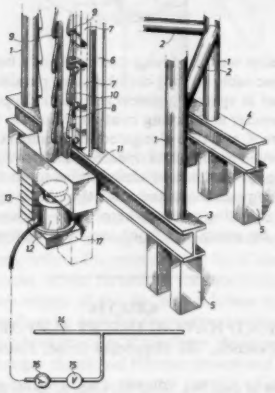
Arne J. Mattson, Vasteras, Sweden, assignor to Paul Anderson Industrier AB, Vasteras, Sweden

Filed May 24, 1976, Ser. No. 689,630

Claims priority, application Sweden, May 29, 1975, 7506170

Int. Cl.² B66F *1/00*

U.S. Cl. 254—105 **3 Claims**



1. A method of lifting or lowering an object on a mast structure by means of a plurality of climbing jacks capable of climbing each along a climb rod, comprising the steps of: mounting the rods to the mast on associated support structures to allow relative movement between the rod and the mast, arranging each rod on a jack associated with each rod, each jack separated from each other from a load point of view, and adjusting the height position of the climb rods in relation to each other by means of a respective associated jack in order to minimize the stresses in the object caused by the lifting operation.

4,053,139

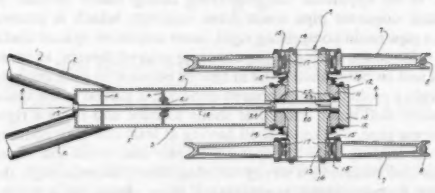
BOOM POINT SHEAVE ASSEMBLY

M. J. Lovaas, Crystal Lake, Ill., and Roger J. Voecks, South Milwaukee, Wis., assignors to Bucyrus-Erie Company, South Milwaukee, Wis.

Filed May 21, 1975, Ser. No. 579,649

Int. Cl.² B66D *1/36*

U.S. Cl. 254—190 R **4 Claims**



1. In a boom point sheave assembly for the outer end of a material handling boom, the combination comprising:

a bearing seat mounted directly to the end of the boom and

having an opening running crosswise to the boom length in a generally horizontal direction;

a sheave shaft extending through said opening with a central curved bearing surface rockably received within said bearing seat, and having opposite ends extending sideward from the central bearing surface to overhang from the sides of the boom; and

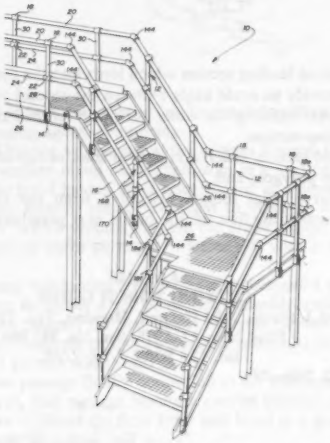
a pair of hoist sheaves each rotatably mounted directly on an end of said sheave shaft and disposed on said sheave shaft outboard of the boom, said sheaves tilting sidewise in unison with a rocking motion of said shaft to reduce torsional stress on the boom during hoist rope offlead.

4,053,140

FIBER REINFORCED PLASTIC HANDRAIL SYSTEM

Donald L. Clemens, 1826 Willow Road, Carrollton, Tex. 75006, and Steven A. Edmiston, 14215 Tanglewood Drive, Dallas, Tex. 75234

Filed Apr. 29, 1976, Ser. No. 681,696
Int. Cl.² E04H *17/00*
U.S. Cl. 256—19 **20 Claims**



1. An improved fiber reinforced plastic handrail system comprising:

a. fiber reinforced, hollow, plastic post members;

b. base mount means for securely affixing each of said post members at its lower end portion to a super structure element of a structure utilizing said handrail system, said base mount means securing each of said post members in a substantially upright, parallel position;

c. fiber reinforced plastic end joint fitting means formed of two halves said end joint fitting means having a collar means at one end thereof defining a passageway therein for receiving a handrail member and leg means at the other end thereof for connecting said fitting means to said post member;

d. a fiber reinforced, hollow, handrail member connected to said collar means of said end joint fitting means to interconnect a plurality of said post members, said handrail being securely affixed in each of said collar means by an adhesive;

e. fiber reinforced plastic inner joint fitting means formed of two halves, said inner joint fitting means having a collar means defining a passageway therethrough for connecting same to said post members at a position intermediate the ends of said posts, said inner joint fitting means further being provided with a pair of leg means extending outwardly in opposite directions from said collar means so as to have a common axis which is substantially perpendicular to the axis of the passageway of said collar means; and,

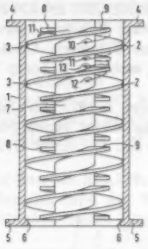
f. fiber reinforced hollow midrail members, one end portion of one of said midrail members being secured to one of said leg means of said inner joint fitting means and the other end of said midrail member being secured to a leg means of an inner joint fitting means positioned on an adjacent post member, said midrail member being secured to said leg means by an adhesive.

4,053,141

STATIC MIXER FOR FLOWING MEDIA

Horst Gussefeld, Uttenreuth, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed July 17, 1975, Ser. No. 596,838
Claims priority, application Germany, Aug. 2, 1974, 2437359
Int. Cl.² B01F *5/24*
U.S. Cl. 366—339 **5 Claims**



1. A static mixer for use with flowing media comprising:

a tubular enclosure; and

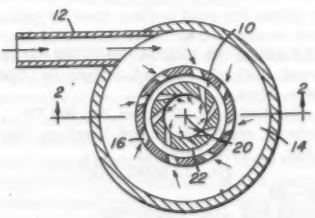
a number of guide surfaces arranged within said enclosure, said guide surfaces being in the form of multiple-thread screw surfaces which overlap each other, have the same sense of rotation, and are concentric with the axis of and extend up to said enclosure, said multiple-thread screw surfaces also being alternatingly interrupted so that an interruption in each one of said surfaces is followed in the axial direction by an uninterrupted portion of another of said surfaces, whereby mixing takes place through recycling the media being mixed while direct flow through said mixer is prevented.

4,053,142

NONMECHANICAL SHEARING MIXER

Walter Johannes, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed June 11, 1976, Ser. No. 695,272
Int. Cl.² B01F *15/02*
U.S. Cl. 366—165 **3 Claims**



1. Apparatus for mixing first and second fluid components, said apparatus comprising;

a. means defining an outer chamber into which the first fluid is supplied under pressure;

b. means defining an inner chamber into which the second fluid is supplied under pressure;

c. means defining an annular mixing chamber interposed

between said inner and outer chambers, said annular mixing chamber having a first and second series of ports therein to said outer and inner chambers respectively, said first series of ports so oriented that the first fluid flowing therethrough from said outer chamber to said annular mixing chamber assumes a generally rotational fluid flow pattern in said annular mixing chamber, said second series of ports so oriented that the second fluid flowing therethrough from said inner chamber to said annular mixing chamber assumes a generally rotational fluid flow pattern in said annular mixing chamber but in a direction generally opposite that of said first fluid rotational fluid flow pattern; and

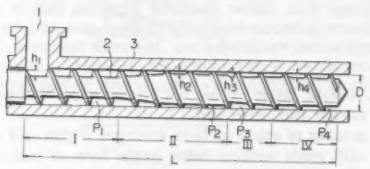
d. means for discharging fluid from said annular mixing chamber.

4,053,143

SCREW FOR USE IN AN EXTRUDER

Akira Hosokawa, Otsu; Yukifusa Miyazaki, Kusatsu; Yoshio Yada, Otsu; Yasuo Kitamura, Otsu, and Masasi Takeda, Otsu, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Sept. 3, 1975, Ser. No. 610,077
Claims priority, application Japan, Nov. 14, 1974, 49-130475
Int. Cl.² B30B *11/24*
U.S. Cl. 366—89 **1 Claim**



1. A screw for use in a non-vent type extruder and having a diameter D, comprising: a feed section having a channel depth h_1 at a rear end thereof; a melting section subsequent to said feed section, having a channel depth gradually decreasing along a forward direction from said value h_1 to a value h_1; a decompression section subsequent to said melting section, having a channel depth increasing from said value h_2 to a value h_3 and gradually decreasing to a value h_4; and a metering section subsequent to said decompression section, where the channel depth has a constant value of h_4; where $h_1 > h_3 > h_4 > h_2$;

$$\frac{h_3}{h_2}\frac{(D-h_3)}{(D-h_2)} > \frac{0.5}{0.5}\frac{h_1}{h_2}\frac{(D-h_1)}{(D-h_2)};$$

and where $1.5 > (h_4/h_2) > 1.15$.

4,053,144

DELTA ROTOR THROUGH FEED MIXER

Henry Ellwood, Rochdale, England, assignor to USM Corporation, Boston, Mass.

Filed May 27, 1976, Ser. No. 690,730
Claims priority, application United Kingdom, May 29, 1975, 23408/75; Apr. 22, 1976, 16292/76
Int. Cl.² B29B *1/06*
U.S. Cl. 366—97 **5 Claims**

1. A through feed mixer comprising:

at least two rotors mounted for rotation in opposite directions about generally parallel axes in a mixing chamber,

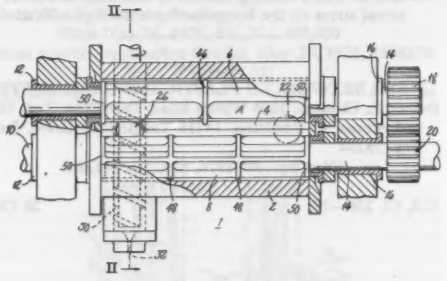
each of said rotors comprising an elongated polyhedron extending axially in said mixing chamber,

each of said elongated polyhedrons having apexes extending generally axially and being generally parallel with one another,

a feeding device adapted to supply material to be mixed to an inlet and portion of said mixing chamber under a substantially constant pressure,

each of said rotors having a cross-section at right angles to its axis of rotation which is derived from a regular n-sided polygon having similar peripheral portions, each peripheral portion including:

a first, narrow section substantially circular about the axis of rotation of said rotor comprising the radially outermost portion of each of said apexes;



a second leading section which leads into the first section to provide an acute angle between the second section and a circle defining the outer periphery of said rotor at that cross-section;

a third section which is in part, at least, of one of the sides of the polygon; and

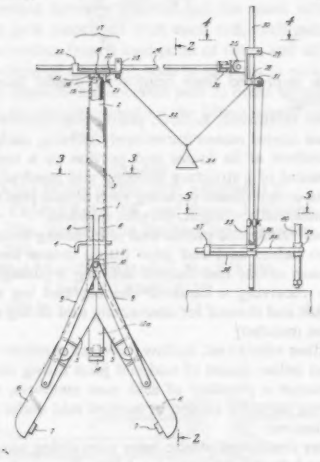
a fourth relief section extending from the third section towards the first section of the next peripheral portion.

4,053,145

CUTTING TORCH GUIDE

Richard J. Steele, 2202 Harwell, Houston, Tex. 77026

Filed Mar. 12, 1975, Ser. No. 557,809
Int. Cl.² B23K *7/04, 7/10*
U.S. Cl. 266—58 **6 Claims**



1. A cutting torch guide having telescoping vertical housings, means on one of said housings for anchoring said housing to the work, and means on the other housing, horizontally adjustable, and having a shaft holder on one end, vertically transverse and horizontally transverse pivotal adjustment means on said shaft holder, a vertical shaft in said shaft holder, and a horizontally adjustable torch holding shaft mounted on

said vertical shaft and freely movable vertically thereon and a cutting torch holder on one end of said torch holding shaft.

4,053,146

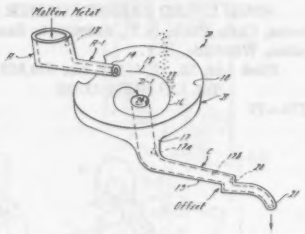
CONTINUOUS STREAM TREATMENT OF DUCTILE IRON

Herschel B. Smartt, and Bela V. Kovacs, both of Dearborn Heights, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 665,019, March 8, 1976. This application Nov. 15, 1976, Ser. No. 742,025

Int. Cl.² C21C *1/00*

U.S. Cl. 266—216 **3 Claims**



1. An apparatus for treating molten metal with a highly reactive treating agent, comprising:

a. a bowl having an opening at the bottom thereof, through which molten metal exists therefrom in a vertical direction, the bowl having an interior shaped as a funnel with an upper interior surface arranged to make an angle of about 5° with a vertical line and the lower region surface arranged to make an angle of about 70° with a vertical line;

b. a pouring cup having a receiving chamber and a conduit effective to direct a jet of molten treatable metal in a direction tangent to the upper interior of said bowl whereby a stream of molten metal is caused to flow in a vortical pattern within said bowl,

c. an outlet passage fluidly connected to the exit opening of said bowl, said passage having a curved interior passage effective to direct the flow from said bowl to a generally horizontal direction, and

d. means for introducing a stream of particulate treating agent into said bowl to engage in molten metal flowing in a vortical pattern therein, said particulate stream contacting the outer peripheral region of said flow.

4,053,147

DEVICE FOR INTRODUCTION OF GASES INTO REACTION VESSELS CONTAINING FLUIDS

Robert Moser, Steg; Alfred Steinegger, Venthone; Fritz Dolder, Wallisellen, and Horst Feddern, Schaffhausen, all of Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

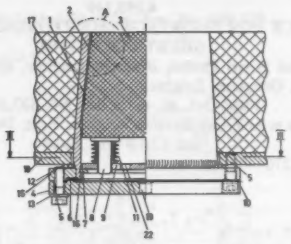
Filed Jan. 14, 1976, Ser. No. 649,137

Claims priority, application Switzerland, Apr. 24, 1975, 5289/75

Int. Cl.² C21C *5/48*

U.S. Cl. 266—220 **2 Claims**

1. A vessel which, when in use, is subject to thermal stress, and which includes a device for introduction of gas through the wall of the vessel, the vessel including an enclosing wall through which there is an opening, and the device comprising a metal sleeve fitting in the opening, means comprising screws and spring washers anchoring the sleeve to the outer face of the wall in an adjustable and easily exchangeable manner, a gas-permeable body of fire-resistant material fitting in the sleeve, and means exerting spring pressure on the body and thereby locating the body in the sleeve in an adjustable and easily exchangeable manner, in which the means exerting spring pressure is at least one dished spring column consisting of a series of pairs of oppositely oriented dished spring washers, in which the dished spring columns abut a metal disc with



openings, which is retained by means of a circlip in an annular groove in the internal surface of the metal sleeve.

4,053,148

RUBBER SPRING AND VEHICLE SUSPENSION INCORPORATING SAID SPRING

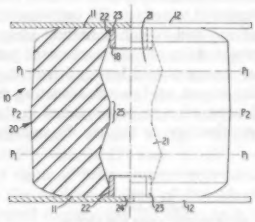
Wallace G. Chalmers, 310 Victoria Ave., Montreal, Quebec, Canada (H3Z 2M9)

Continuation-in-part of Ser. No. 368,729, June 11, 1973. This application Dec. 30, 1974, Ser. No. 537,330

Claims priority, application United Kingdom, June 12, 1972, 2728/72

Int. Cl.² B60G *11/22*

U.S. Cl. 267—63 R **8 Claims**



1. A suspension system for vehicle including a sprung chassis member and an unsprung suspension member movable vertically underneath said chassis member, said members being separated by a spring, said suspension member being located by torque rod means so that distortion of the spring occurs principally by axial compression, said spring comprising an integral body of elastic material such as rubber, said body having opposed end faces, and in which the body has freely exposed sides extending between said end faces and having substantially smooth contours uninterrupted by depressions, the body having an axial cavity extending between said faces, said cavity being of divergent/convergent form and having a relatively small cross-sectional area at the end faces and at a central plane between the end faces and having a maximum cross-sectional area at two transverse planes intermediate the respective end faces and said central plane whereby the cross-sectional area of the material in the body is minimized at said transverse planes and the cross-sectional area of said material is maximized at the central plane between the end faces, the maximum transverse dimension of said cavity at each of said two transverse planes being less than one half the transverse dimension between the sides of the body at the same plane;

said spring being characterized by bulging less, radially outwardly under full axial compressive load, than would be the case were the same spring to have an exterior waist at said central transverse plane and have its largest trans-

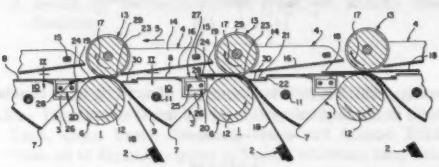
verse cross-sectional areas where said cavity is of largest internal diameter.

4,053,149

DEVICE FOR SHORTAGE MONITORING INSIDE A SHEET COLLATOR

Jean Jules Henri Paulus, Brussels, Belgium, assignor to C. P. Bourg, Ottignies, Belgium

Filed Oct. 30, 1975, Ser. No. 627,296
Claims priority, application Belgium, Sept. 24, 1975, 160325
Int. Cl.² B65H *39/04*
U.S. Cl. 270—58 **12 Claims**



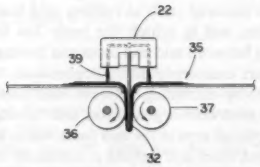
1. Device for shortage monitoring inside a sheet collator having a plurality of bins for holding sheet stacks, said bins being arranged underneath lower and upper guiding and conveying members forming therebetween a substantially horizontal path for the sheets discharged from said bins, said shortage monitoring device comprising for each bin an elongated flexible leaf having a portion thereof positioned in said horizontal path, an electric microswitch, and a displaceable switch actuating means positioned between a movable end of leaf and the microswitch, said flexible leaf end normally contacting the switch actuating means which responds to such contact to be displaced in one direction to actuate the microswitch into one condition, said leaf end and switch actuating means being so positioned on opposite sides of said horizontal path that the presence of a sheet separates said leaf end from contact with said switch actuating means, said switch actuating means being responsive to such separation to be displaced in the direction opposite to said one direction to actuate the microswitch into another condition.

4,053,150

FOLDER APPARATUS

Leslie A. Lane, Indianapolis, Ind., assignor to Cornelius Printing Co., Indianapolis, Ind.

Filed Mar. 8, 1976, Ser. No. 664,622
Int. Cl.² B65H *45/18*
U.S. Cl. 270—67 **5 Claims**



1. In a folder apparatus having a movable folding blade and having a platform including a surface and defining a blade-receiving slot generally aligned with the path of said blade, the blade having a folding edge positioned outwardly of the platform surface on one side of the platform when the blade is not received within the slot, the improvement which comprises:

the folding blade including air flow means receiving compressed air at an inlet for directing a flow of air at the platform surface adjacent the slot when the blade is moved near the slot;

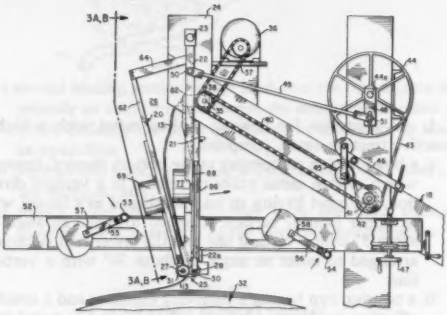
the air flow means comprising a manifold member receiving compressed air at an inlet, the folding blade being elongated and having a first side and second side, the manifold member having a first portion extending beyond the first side of the folding blade and a second portion extending beyond the second side of the folding blade, each said manifold portion defining a passageway for air flow in communication with said inlet, each said passageway terminating in an opening in the manifold directed toward the folding edge of said folding blade, whereby a flow of air is directed adjacent each side of the blade in the direction of the slot and adjacent to the platform surface when the blade is moved near the slot.

4,053,151

HIGH SPEED FABRIC FOLDER

Robert Frezza, Carle Place, N.Y., assignor to Samcoç Holding Corporation, Woodside, N.Y.

Filed Apr. 26, 1976, Ser. No. 679,889
Int. Cl.² B65H *45/20*
U.S. Cl. 270—79 **7 Claims**



1. Apparatus for folding fabric at high speed, which comprises

a. a receiving platform,

b. a fabric folding guide mounted for back and forth oscillating movement above said platform,

c. said folding guide comprising a pair of opposed, downwardly extending guide panels for directing the fabric in a back and forth direction during the oscillation of the following guide,

d. opposing faces of said guide panels being of air permeable construction across their entire working widths,

e. means for directing fabric web downward between the opposed guide panels, and

f. means for maintaining a continuous flow of air through the permeable guide panels and toward the opposite surfaces of the fabric web.

4,053,152

SHEET FEEDING DEVICE

Osamu Matsumoto, Ebina, Japan, assignor to Rank Xerox, Ltd., London, England

Filed July 27, 1976, Ser. No. 709,157
Claims priority, application Japan, Oct. 16, 1975, 50-140026[U]
Int. Cl.² B65H *1/02*
U.S. Cl. 271—9 **5 Claims**

1. A sheet feeding apparatus for feeding a sheet from a stack thereof comprising:

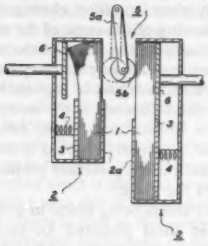
means for feeding a sheet from said stack in an upwardly direction, said feeding means being arranged for movement between a first feeding position wherein it engages a first portion of said stack and is adapted to feed a sheet

from said stack, and a second position spaced from said stack;

means for supporting said stack of sheets, in a generally vertical orientation so that said feeding means can feed said sheet from said stack in said upwardly direction;

said support means including means for fanning out said first portion of said stack;

said fanning out means including a first means arranged for movement between first and second support positions, said first means being operable in its first position to supportingly engage said first portion of said stack against a



contact force of said feeding means, and said first means in its second position being disengaged from said stack to allow said stack to fan out;

said support means further including means for restraining a second portion of said stack different from said first portion, said restraining means being operable when said first means is in its first or second positions, said first portion of said stack being arranged upwardly of said second portion thereof;

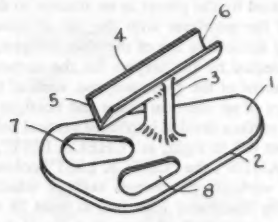
whereby when said feeding means is in its second position and said first means is in its second position, said stack is fanned out to allow air to easily enter between the sheets.

4,053,153

BILLIARD-BRIDGE AND STROKE TRAINER

Frederick G. Josenhans, 14020 Netherfield Drive, Midlothian, Va. 23113

Filed Apr. 29, 1976, Ser. No. 681,553
Int. Cl.[2] A63D *15/10*
U.S. Cl. 273—23 3 Claims



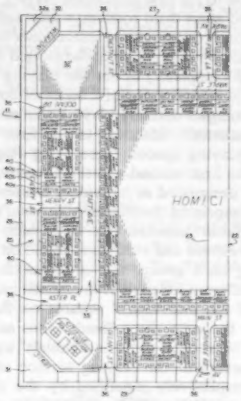
1. A bridge and stroke training device comprising a rigid base, a support post of convenient height extending upwardly from said base, an elongated cue guide of convenient length attached to the upper end of said support post and positioned in a plane essentially horizontal to said base, said guide being an open trough having a V-shaped forward end and a back end having a semi-circular configuration, said support post being capable of limited bending movement only in a plane perpendicular to the plane of said base and coextensive with the longitudinal axis of said guide.

4,053,154

HOMICIDE BOARD GAME

Henry P. Niemann, 305 W. 18th St., Apt. 2-A, New York, N.Y. 10011

Filed May 24, 1976, Ser. No. 689,639
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—134 B 1 Claim



1. A homicide board game for playing by a plurality of players each assuming the roles of detectives, the players each following a multitude of clues to determine the murderer of a named murdered victim, the game comprising, in combination:

a first deck of information cards identified as Clue cards, the deck consisting of five identically shaped and configured rectangular flat cards each having a back side and a face side, the back side of each card being identical to prevent distinguishment of the cards from each other when placed with the face side down, the face side of each card each containing a different name of a clue imprinted thereon, the different clues being "GLOVE", "KEYS", "SCARF", "BLOOD" and "CAR";

a second deck of information cards identified as Weapon cards, the deck consisting of five identically shaped and configured rectangular flat cards each having a back side and a face side, the back side of each card being identical to prevent distinguishment of the cards from each other when placed with the face side down, the face side of each card each containing a different name of a weapon imprinted thereon, the different weapons being "KNIFE", "GUN", "AXE", "ROPE" and "POISON", the weapon cards being identical in configuration as the clue cards;

a third deck of information cards identified as Motive cards, the deck consisting of four identically shaped and configured rectangular flat cards each having a back side and a face side, the back side of each card being identical to prevent distinguishment of the cards from each other when placed with their face side down, the face side of each card each containing a different name of a motive imprinted thereon, the different motives being "JEALOUSY", "BLACKMAIL", "HATE" and "MONEY", the motive cards being identical in configuration as the clue cards and the weapon cards;

a plurality of Murderer Sheets each being of an identical flat rectangular configuration having a flat face surface and a flat back surface;

a flat, rectangularly shaped game board having a flat playing surface imprinted on a flat face surface thereof, a flat back surface, a top edge, a bottom edge, and opposed side edges, the game board divided into equal half portions and hinged along its central axis permitting the half portions to fold onto each other in face-to-face relationship for ease of storage and transportation of the game board, a first roadway extending continuously about the outermost periph-

ery of the playing surface adjacent to the edges thereof and formed of a series of consecutive side-by-side rectangles defining playing spaces therealong, a second roadway substantially concentric with the first roadway and spaced inwardly therefrom and defining a general rectangular shape and formed of a series of consecutive side-by-side rectangles defining playing spaces which are substantially indentical to the first mentioned playing spaces, a plurality of spaced apart third roadways disposed between the first and second roadways and interconnecting portions of the first roadway to portions of the second roadway at spaced intervals completely about the playing surface, the third roadways each formed of a series of consecutive side-by-side rectangles defining playing spaces therealong which are substantially identical to the first and second mentioned playing spaces, there being disposed at intervals along the first, second and third roadways a multitude of squares designated as individual houses with each square having imprinted thereon an individual's name and a set of three "leads" selected one from each of the groups of clues, weapons and motives as found on the decks of cards defining each group, the combination of three "leads" being different for each of the named individuals such that none of the individuals' squares on the playing surface contain the same three "leads" thus making each square unique from each other individuals' square, three of the four corners of the playing surface of the game board being respectively identified by the marking imprinted thereon of "WEAPON", "MOTIVE" and "CLUE" with portions of the game board adjacent thereto being designated as positions on which the respective decks of Clue cards, Weapon cards, and Motive cards are intended to be stacked in a face-down manner for individual selection thereof by the players of the game during the play of the game;

a plurality of distinctive markers, one for each player of the game, for use by each player of the game to mark the player's position on the game board as the play of the game proceeds from player to player, each marker of a configuration to be readily received in any roadway rectangle or individuals' square to mark the players position thereon;

a chance device in the form of a conventional die for use in turn by each of the players in determining the length and position of each of the player's movements along the roadways of the game board playing surface as the player progress thereabout;

a player gaining access to an individual's square to interrogate the individual named thereon by landing on a roadway rectangle immediately adjacent such individual's square and on which the square faces;

a miniature figure in the form of a dead body for use in marking on the game board the name of the murdered victim for all players to clearly see and for which the murderer must be detected by the players, the player successfully detecting the name of the individual who murdered the victim being determined the winner of the game;

a police file container adapted to sit freely in the middle of the game board for ready access by each of the game players, the container having a flat horizontal top surface, a flat horizontal bottom surface, a vertical bottom end, opposed vertical side ends, and an open top end providing access therethrough to an open topped compartment formed interiorly of the container between the surfaces thereof, the compartment adapted to receive therein a plurality of the Murderer Sheets in a stacked relationship with the face surface of the topmost sheet facing upwardly, the top surface of the container is provided with a multitude of squares marked thereon with each of the squares having imprinted thereon an individual's name and street address corresponding to the individual's square on the game board, a slot shaped opening is formed in each of the squares opening through the container top surface in communication with the sheet compartment to provide visibility of a portion of the Murderer Sheet disposed in the compartment immediately adjacent the container top surface, a flap defining door member disposed in each of the slots and operative between a normally closed position closing the slot and preventing visibility of the murderer sheet therebelow and an open position providing selective viewability of the murderer sheet through the slot, a Murderer opening formed in the container top surface separate from the squares imprinted thereon and positioned to register with the name of the murderer found on the murderer sheet positioned beneath the container top surface, a flap defining door member disposed in the murderer opening and operative between a normally closed position closing the opening and preventing viewing of the name of the murderer and an open position disclosing the name of the murderer through the opening, a signal defining aperture formed in the container top surface and adapted to register with a portion of the murderer sheet disposed in the compartment immediately therebelow to provide a visual indication that the murderer sheet is properly inserted in the container compartment beneath the top surface preparatory to and during the play of the game;

the murderer sheets being plural in number with their being a murderer sheet prepared for each of the individuals named on the individual game board squares, the name of the individual on each sheet being imprinted on the face surface thereof in a position to register with the murderer opening in the container top surface upon the sheet being placed in the container compartment, marking indicia imprinted on each of the murderer sheet face surfaces in a position to register with the signal aperture of the container top surface to indicate the proper positioning of the murderer sheet in the container compartment when the sheet is inserted therein, a plurality of markings disposed about the face surface of each of the murderer sheets adapted to register with some of the slotted openings in the container top surface for viewability through such slots upon the opening of the flap door associated with such slot, the markings indicating those individuals which are suspect from those individuals which are innocent to thus provide clues for the players for the determination of the name of the murderer;

a plurality of detective notebook sheets each of a flat rectangular sheet of paper having a plurality of vertical and horizontal lines imprinted on a face surface thereof defining columns and rows of such columns, the sheets being for use in conjunction with appropriate indicia on the game board with one sheet assigned to each game player for listing thereon by the player the names of individuals interrogated by the player in an attempt to determine the name of the murderer with the use of information provided by successive use of the clue, weapon, and motive cards selected by the players for the purpose of logical development of the game purpose, each of the notebook sheets are of an identical shape and configuration having the face surface divided into three vertical columns identified, from left to right, as "CHECK LIST", "NAMES" and "NAMES", the "CHECK LIST" column is divided into six vertical sub-columns each of which is, in turn, difided by horizontal lines into at least 26 vertically arranged squares, the first sub-column on the left having the letters of the alphabet "A" through "Z" written in the squares thereof, the remaining five sub-columns each being identified at the head thereof by the numbers 1 through 5 respectively, each of the "NAMES" columns being identical and each divided into six vertical sub-columns with each sub-column divided by the same horizontal lines passing through the "CHECK LIST" column to provide at least 26 separate vertical squares for each column, the "NAMES" sub-column being identified, starting from the left, by the numbers 1-5 respectively for the first five columns with the sixth sub-column being

identified by the letter "S", the name of each individual named on the game board has exactly five letters in the name such that an individual's name chosen to be interrogated by a player is written into the first five sub-columns of a "NAMES" column with the marking "S" placed in the "S" sub-column if such interrogated individual's name indicates on the police file container as being a suspect as indicated by a marking on the murderers sheet disposed in the container compartment and exposed through one of the openings in the top member of the police file;

there being a like number of separate individuals' squares on the game board as there are individuals listed on the police file container top surface as there are murderers' sheets each corresponding to one of the named individuals;

each individual has uniquely associated therewith on the individual square of the game board three "leads" with one of the leads corresponding to a Clue card, one of the leads corresponding to a Weapon card, and one of the leads corresponding to a Motive card; and

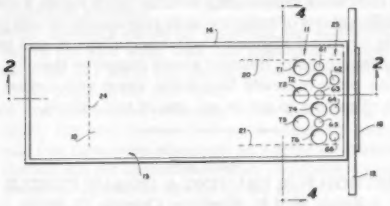
whereby a murderer sheet is picked at random with the murderer name hidden, the sheet placed in the container compartment beneath the top surface thereof with the indicia on the sheet in registration with the openings in the container, a detective sheet is assigned to each player for the players use along with one of the markers, and the die is tossed by each player in turn as they progress along the roadways and interrogate individuals on the game board as they progress thereabout to determine the name of the murderer, the first player to do so being determined the winner.

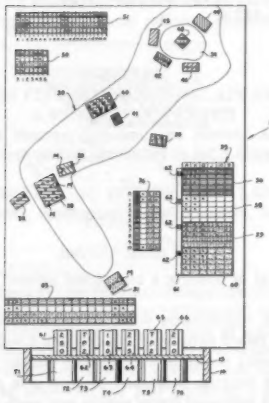
4,053,155

MULTIPLE-GAME GAME BOARD WITH GOLF PUTTING SELECTING MEANS

Ralph S. Williams, 1355 Briarwood Road NE., Apt. N-5, Atlanta, Ga. 30319

Filed Apr. 28, 1976, Ser. No. 681,345
Int. Cl.² A63F *7/06*
U.S. Cl. 273—87 C **7 Claims**





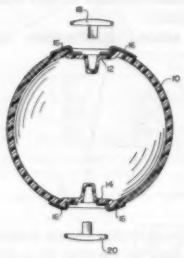
1. A game comprising a game board including a plurality of locations, at least one marker selectively movable to each of said plurality of locations, and selecting means for determining which of said plurality of locations said marker is to be next moved to, said selecting means including a playing surface, fixed target means on said playing surface comprising a plurality of targets, and variable programming means comprising a plurality of value indicia for each target, a plurality of first indicia on said game board distinguishing each said plurality of locations from each other and a plurality of second indicia on said variable programming means, one for each of said value indicia, each of said plurality of first indicia having a characteristic identical to a characteristic of at least one of said second indicia for relating one of said value indicia of said variable programming means with each target in accordance with the location of said marker.

4,053,156

BALL FOR TARGET DART GAME

Henry S. Bai, 421-14 Picadilly Place, San Bruno, Calif. 94066

Filed Aug. 25, 1976, Ser. No. 717,640
Int. Cl.² A63B *65/00*
U.S. Cl. 273—106 R **5 Claims**



1. A ball for use in a target game, which game includes a target formed of a sheet of fabric having upstanding filamentary elements adapted to engage and hold the ball against that portion of the target struck by the ball as the ball is thrown against the target, the ball comprising: a light-weight spherical-shaped body; a pair of diametrically opposite bushings mounted on said spherical-shaped body; a plurality of strips of Velcro material mounted on said spherical-shaped body with the respective ends of each such strip extending partially across respective ones of said bushings; and a plurality of plugs respectively mounted in said bushings, each of said plugs having a head extending across the corresponding ends of said Velcro strips to maintain said ends in engagement with the surface of said spherical-shaped body.

4,053,157

BOARD GAME APPARATUS

Gary J. Cowan, 6952 Bruckner, Detroit, Mich. 48210

Filed Nov. 1, 1976, Ser. No. 737,066
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 AT **8 Claims**

1. A game apparatus, which comprises in combination:

a plurality of first movable game pieces, each of said first movable game pieces being of a different color;

a plurality of second movable game pieces, equal in number to said first movable game pieces, and each being of the same color as a different one of said first movable game pieces;

a substantially square game board having a first side, second side, third side and fourth side;

a plurality of squares located along said first side, said second side, said third side and said fourth side of said game

board for accommodating said first and second movable game pieces;

directional information printed in each of said squares;

a first corner square located at the intersection of said squares along said first side and said squares along said fourth side of said game board;

directional information printed in said first corner square;

a second corner square located at the intersection of said squares along said first side and said squares along said second side of said game board;

directional information printed in said second corner square;

a third corner square located at the intersection of said squares along said second side and said squares along said third side of said game board;

directional information printed in said third corner square;

a fourth corner square located at the intersection of said squares along said third side and said squares along said fourth side of said game board;

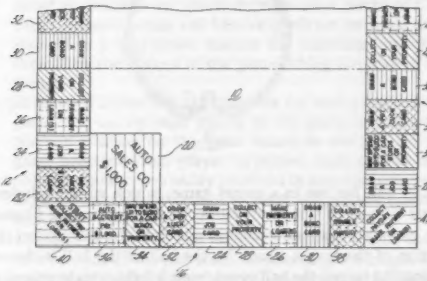
directional information printed in said fourth corner square;

a first block disposed generally at one corner of said game board adjacent the intersection of said squares located along two of said sides of said game board;

information printed in said first block;

a plurality of first information members containing printed information pertaining to directional information printed in a predetermined number of said squares and relating to the loan of money;

a plurality of second information members containing



printed information pertaining to directional information printed in a predetermined number of said squares and relating to various jobs;

a plurality of third information members containing printed information pertaining to directional information printed in a predetermined number of said squares and relating to property;

a plurality of fourth information members containing printed information pertaining to directional information printed in a predetermined number of said squares and relating to bonds;

a plurality of play directing fifth information members containing directional information pertaining to directional information printed in a predetermined number of said squares and further pertaining to information contained on said fourth information members, which directional information relates to the payment and receipt of money related to the value of bonds;

a plurality of play directing sixth information members containing directional information printed in a predetermined number of said squares and further pertaining to information contained on said second information members, said third information members and said fourth information members, which directional information relates to the payment and collection of money and the advancement of the game pieces;

a predetermined amount of artificial money of various face value amounts to be distributed to the players of the game apparatus as a loan to be repaid; and

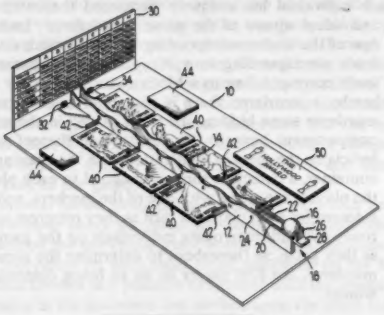
a pair of dice to be thrown one die at a time or together by the players of the game to determine the movement of said first game piece and said second game piece, respectively.

4,053,158

SKILL-TYPE BOARD GAME

Jeffrey D. Breslow, Highland Park, and Eugene Jaworski, Park Ridge, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Jan. 26, 1976, Ser. No. 652,430
Int. Cl.² A63F 3/00
U.S. Cl. 273—135 R **3 Claims**



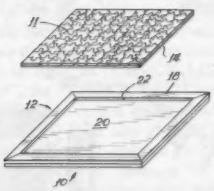
1. A game of skill and chance comprising a game board for play by a plurality of players, a set of master play directing cards each having indicating means instructing a player as to a playing move to be made by the player, a skill device mounted on said board manually operable by a player to obtain a skill oriented score upon receipt of instructions to the player by a play directing card to operate the skill device, said skill device comprising an undulated surface having a plurality of valleys spaced therealong representing different score values, a plurality of different sets of category cards positionable on said game board in structural alignment with said valleys of said undulated surface to define different award categories therefor, and a playing piece manually launchable along said surface and capable of coming to rest in any one of said valleys.

4,053,159

METHOD FOR FRAMING A JIG-SAW PUZZLE

Walter J. Kulak, 5808 N. Winthrop, Chicago, Ill. 60660

Filed May 6, 1976, Ser. No. 683,871
Int. Cl.² A63F 9/10
U.S. Cl. 273—157 R **6 Claims**



5. A method of framing a completed jig-saw puzzle, comprising:

providing a combination work assembly board and frame having a raised peripheral rim defining a well therewithin for receiving the completed jig-saw puzzle;

providing a backing sheet and placing it in overlying engagement with said frame within said well;

assembling the jig-saw puzzle in said frame on said sheet;

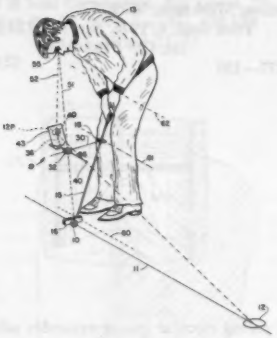
coating the front face of the completed jig-saw puzzle in said frame with an adhesive;
permitting the coated puzzle to cure;
lifting the backing sheet out of said well to remove the coated puzzle therefrom; and
attaching the rear face of the puzzle to said frame within said well.

4,053,160

GOLF CLUB SWING TRAINING DEVICE

Joseph M. Salata, 4716 Behrwald Ave., Cleveland, Ohio 44144

Filed Mar. 12, 1976, Ser. No. 666,187
Int. Cl.² A63B *69/36*
U.S. Cl. 273—186 A **10 Claims**



1. A golf device for aiming a ball toward a target by a player with a golf club having a shaft and a face, comprising in combination:
an alignment member;
a reflector element;
first means mounting said reflector element relative to said alignment member;
second mounting means for mounting said alignment member to the club shaft with said alignment member being disposed in a plane containing a line substantially normal to the plane of the club face;
said first and second mounting means establishing concurrently first and second three point alignment paths, with said first three point alignment path being the player's eye, the ball and the alignment member therebetween superimposed on the ball as viewed by the player;
and said second three point alignment path being the target, the player's eye and the alignment member therebetween and pointing toward the target with this path being bent at about a right angle by said reflector element.

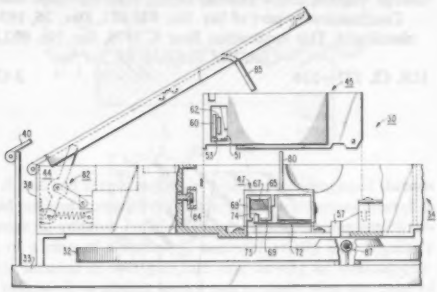
4,053,161

STYLUS ARM LIFTING/LOWERING APPARATUS FOR A VIDEO DISC PLAYER

John Clifford Bleazey, Trenton, and Marvin Allan Leedom, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,309
Claims priority, application United Kingdom, Sept. 15, 1975, 37847/75
Int. Cl.² G11B *3/10*
U.S. Cl. 274—23 R **8 Claims**

1. In a playback system for recovering prerecorded information from a spirally grooved record disposed on a turntable rotatably mounted with respect to a base of said system; said system including a stylus arm carriage mounted for lateral motion with respect to said base between and off record rest position and an above-record play position; a groove riding stylus secured to one end of a stylus arm; the end of said stylus arm remote from said one end being secured to a support member mounted within said carriage via a compliant coupler; said securing of said compliant coupler to said support member being such that the axes of said compliant coupler and said stylus arm are aligned when said stylus arm is occupying a lowered position; said compliant coupler being in a substantially unstressed condition when the axes of said compliant coupler and said stylus arm are aligned; said lowered position of said stylus arm establishing stylus/record contact for playback when said carriage is in said above-record play position; an apparatus comprising:
1. a stylus arm rest mounted in said carriage for motion between an elevated position and a depressed position;
said stylus arm rest in said elevated position supporting said stylus arm in a raised position; said raised position of said stylus arm being such that said stylus/record contact is precluded when said carriage is in said above-record play position;
said stylus arm rest in said depressed position permitting said stylus arm to occupy said lowered position;



2. selectively actuated means mounted within said carriage for causing motion of said stylus arm rest between said elevated and depressed positions;
3. actuating means subject to engagement with said selectively actuated means, and responsive to motion of said carriage from said above-record play position to said off-record rest position, for causing said stylus arm rest to assume said depressed position when said carriage is in said off-record rest position;
4. selectively energized means mounted within said carriage for causing motion of said stylus arm rest between said elevated and depressed positions;
5. means for selectively energizing said selectively energized means when said carriage is in said above-record play position to establish said stylus/record contact for playback; and
6. means for causing said stylus arm rest to occupy said elevated position in the absence of said engagement and said energization.

4,053,162

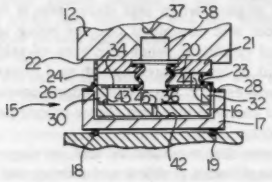
DYNAMIC AIR BEARING SEAL - RADIALLY AND AXIALLY STABILIZED

Roger O. Bjerk, Edelstein, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 23, 1976, Ser. No. 660,536
Int. Cl.² F16J *15/40*
U.S. Cl. 277—75 **9 Claims**

1. A pressurized sealing arrangement comprising a rotatable shaft, a generally ring-shaped thrust sleeve mounted on said shaft, an outer, ring-shaped sleeve mounting a flexible mounting member, a ring-shaped inner sleeve intermediate and spaced from said thrust sleeve and said outer sleeve, said inner sleeve being supported by said mounting member and defining an air chamber therein, passage means in said mounting member intercommunicating said outer sleeve with said chamber,

and a plurality of jets in said inner sleeve positioned so as to direct pressurized fluid into said thrust sleeve from said chamber and thereby cause said inner sleeve to be centered with respect to said thrust sleeve.

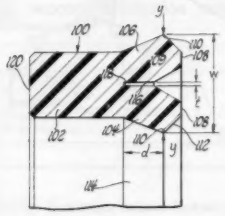


4,053,163

SEAL CONSTRUCTION

George Vegella, 25150 Thomas Drive, Warren, Mich. 48091

Continuation-in-part of Ser. No. 536,681, Dec. 26, 1974, abandoned. This application June 4, 1976, Ser. No. 692,831
Int. Cl.[2] F16J 15/18
U.S. Cl. 277—124 3 Claims



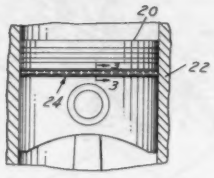
1. A one piece seal member of elastomeric material comprising: an endless main body portion; a pair of endless leg portions enclosing the central axis of said body, said leg portions projecting integrally from said main body portion in side by side relation to free end portions; said leg portions each having an outer sealing portion including an outwardly projecting apex portion defined at the intersection of two flat surfaces disposed at an angle with respect to each other, said apex portion defining a sealing tip; and said leg portions each having inner substantially flat inclined surfaces extending from the side of said respective free ends opposite said apex portions; an endless narrow groove formed between said leg portions and enclosing the central axis of said body; said groove having side walls extending from a closed base at the end of said groove remote from the free ends of said leg portions to a normally open end at the juncture between the inner surfaces of said leg portions; said sealing tips each being located in the direction of the central axis of said body between the normally open end of said groove and the free ends of said leg portions; said groove having substantially parallel side walls, said groove being unobstructed throughout its length between the side walls thereof to permit complete closure of said normally open end throughout its length; said leg portions having an unstressed position with respect to each other in which said groove is open such that any movement of said leg portions toward each other from said unstressed position such as by forces applied on said sealing tips flexes said leg portions about the base of said groove to provide relatively low resistance to movement of said sealing tips toward each other because of the relatively long moment arm between said sealing tips and the base of said groove; said leg portions having an installed position with respect to each other in which the open end of said groove is closed such that any further movement of said leg portions toward each other such as by forces applied on said sealing tips can only take place about the closed end of said groove at the juncture between said inner surfaces to provide higher resistance to movement of said sealing tips toward each other because of the shorter moment arm between said sealing tips and the juncture of said inner surfaces at the closed end of said groove such that resistance to movement of said sealing tips toward each other, and hence the sealing pressure exerted thereby, abruptly increases when said leg portions are flexed from the unstressed to the installed positions with respect to each other.

4,053,164

SPACER-EXPANDER FOR A PISTON OIL CONTROL RING

Lee H. Saylor, Muskegon, Mich., assignor to Sealed Power Corporation, Muskegon, Mich.

Filed Sept. 8, 1976, Ser. No. 720,273
Int. Cl.[2] F16J 9/20
U.S. Cl. 277—139 8 Claims



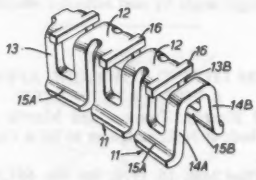
1. In a parted circular spacer-expander adapted for use in combination with a parted rail as a nonbottoming self-expanding piston oil control ring and including a plurality of alternating concentric circumferentially spaced inner and outer crowns integrally interconnected by generally diverging spring legs and a plurality of supporting pads, each said pad having an inner edge integrally connected by a pad leg to a corresponding inner crown and having an outer edge disposed outwardly of said outer crowns, the improvement wherein each said pad leg comprises a reverse bend extending radially inwardly from an inner crown and then radially outwardly to a corresponding pad.

4,053,165

OIL RING DESIGN

Edward Douglas Hartley, Halifax, England, assignor to Hepworth & Grandage Limited, EN

Filed Dec. 17, 1975, Ser. No. 641,372
Int. Cl.[2] F16J 9/06
U.S. Cl. 277—140 6 Claims



1. A piston ring assembly including two ring elements and a spacer-expander element which spaces apart the ring elements and resiliently loads them in a radially-outward direction, the spacer-expander element having its free ends in abutment and including a series of interconnected parts, short circumferential connecting means at the radially outer periphery of said spacer-expander element to interconnect adjacent parts, each part comprising two spaced-apart pairs of limbs bent inwardly through nearly a right angle from said connecting means, the limbs of each pair being connected only at their inner ends, the

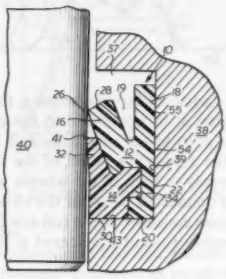
inner ends of said limbs being interconnected by respective spaced-apart portions which extend circumferentially and axially of the element, and the respective spaced-apart portions being in contact with and resiliently outwardly loading the ring elements, the spacer-expander element including at the outer periphery thereof a spacer element between the two pairs of limbs of each said part, said spacer element being connected to the center of said part and extending transversely to space apart said ring elements at the outer periphery of the spacer-expander element.

4,053,166

TWO-PIECE SEAL

Ronald A. Domkowski, Arlington Heights, Ill., assignor to Halogen Insulator & Seal Corporation, Elk Grove, Ill.

Filed Dec. 8, 1975, Ser. No. 638,522
Int. Cl.² F16J 15/32
U.S. Cl. 277—152 **3 Claims**



1. A composite seal for sealing engagement with a radially extending end wall and an axially extending wall defining an annular cavity in a stationary member and for sealing with a moving member, said seal comprising:

a first soft flexible annular sealing ring made of elastomeric material having an annular sealing lip edge for sealing engagement with the moving member at first predetermined pressures, said sealing lip having a chamfered edge inclined to be pressed by higher pressure forces to have greater contact area;

a second lip on said first sealing ring being inclined radially away from said first lip said second lip being spaced from said first lip and defining an annularly extending groove therebetween;

an axially extending wall on said first sealing ring extending from said second lip and coacting with said second lip for sealing engagement with the axially extending wall defining the annular cavity;

a second annular sealing ring of material harder than the material of said first sealing ring and having a friction characteristic lower than that of said elastomeric material, said second sealing ring having a radially directed extending sealing lip and having an edge for engaging said moving member at a position spaced axially downward from said annular sealing lip on said first ring, each of said sealing edges on said first and second seals having a diameter for sealing in interference with said moving member at a low pressure loading of said seal, said first and second sealing rings having surfaces abutting one another to deflect the sealing lip on said second ring to deform into greater contact area with said moving member with increased pressure on said first sealing ring,

a radially extending end wall on said flexible sealing ring disposed behind a portion of said second sealing ring for sealing engagement with the radially extending end wall on said stationary member, said axially extending wall on said first sealing ring extending from said second lip to said end wall, and

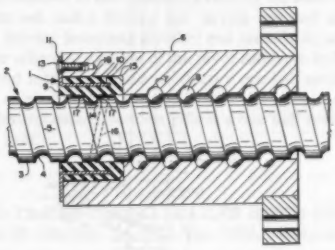
interlocking means on said first and second sealing rings mated with one another to prevent substantial relative displacement bodily of said first sealing ring relative to said second sealing ring and thereby reducing a likelihood of bypass leakage between said first and second sealing rings.

4,053,167

SEAL FOR BALL BEARING SCREWS AND THE LIKE

Jerry George Jelinek, LaHabra, Calif., assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Oct. 18, 1976, Ser. No. 733,710
Int. Cl.² F16J 15/16; F16H 55/22
U.S. Cl. 277—165 **10 Claims**



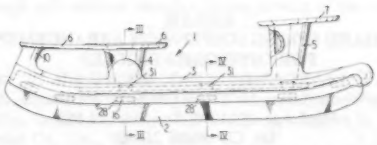
1. A nut and screw assembly wherein interengaged threads of said nut and screw effect relative axial movement thereof in response to relative rotation thereof, the combination therewith of a ring of elastomeric material axially and angularly fixedly secured to said nut; said ring having an internal one-turn helical rib in sliding sealed engagement with the crest of the thread of said screw and terminating in end portions having sliding sealed engagement with said crest to its junctions with the thread groove therebetween; said ring having a radially inwardly extending projection between said end portions having sliding sealed engagement with said thread groove from crest to crest thereof.

4,053,168

SKATE AND METHOD OF PRODUCING SAME

Ludovicus J. Goverde, Whitby, Canada, assignor to Ontario Tool Design Inc., Canada

Filed Feb. 26, 1976, Ser. No. 661,793
Claims priority, application Canada, Oct. 10, 1975, 241486
Int. Cl.² A63C 1/22
U.S. Cl. 280—11.12 **5 Claims**



1. An ice skate of the type having a plastic, generally unitary upper portion including a base section and two flange portions for securing the skate to a boot, and a metallic runner embedded in a lower section of said upper portion with a lower section of said runner protruding downwardly along said base section wherein said plastic, generally unitary upper portion comprises two uneven halves, said runner being located between the base sections of said two halves, said two halves being fixedly secured to each other along a joint extending generally longitudinally with respect to said runner, wherein one of said halves is an integral part including at least one complete flange portion and a substantial portion of a support-

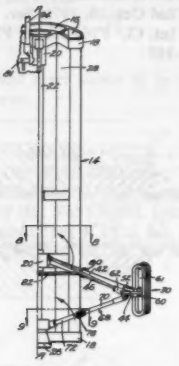
ing column section associated with said at least one complete flange portion.

4,053,169

COMBINED GOLF BAG AND CART MECHANISM

Clarence R. Taylor, 28 Woodside Drive, Penfield, N.Y. 14526

Filed Apr. 5, 1976, Ser. No. 673,583
Int. Cl.² B62B 11/00
U.S. Cl. 280—37 12 Claims



1. A combined golf bag and cart mechanism comprising:

a golf bag having an elongated peripheral cavity defining an axis;

a golf cart permanently secured to said bag and movable between a retracted position in which said cart wholly nests in said cavity, and an extended position in which said cart supports said bag for transport on said wheels, said golf cart further including a pair of wheels and orienting means for pivotally coupling each of said wheels to said bag and for maintaining each of said wheels in parallel planes relative to said axis;

said orienting means for each of said wheels further comprising a first lever having one end pivotally mounted on a first pivot pin on said bag, and a second lever pivotally connected to the opposite end of said first lever, said second lever having one end coupled to said wheel and the opposite end pivotally coupled to said bag on a second pivot pin spaced from said first pin; and

rigid detachable support rods interconnecting said first lever of each of said wheels to said bag for supporting said first levers and said wheels in said extended position of said cart.

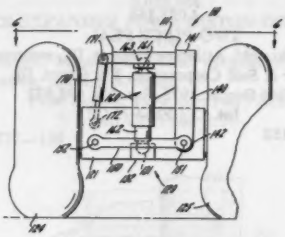
4,053,170

PANHARD SPRING SUSPENSION ARRANGEMENT FOR OFF-ROAD VEHICLES

John H. Hyler, and Edward G. Orth, both of Peoria, Ill., assignors to Westinghouse Air Brake Company, Pittsburgh, Pa.

Filed Apr. 29, 1976, Ser. No. 681,465
Int. Cl.² B60G 21/00
U.S. Cl. 280—112 R 10 Claims

1. In a heavy duty suspension for an off-road vehicle, the combination comprising a chassis, an axle assembly below the chassis, the axle assembly including a transversely extending axle housing having wheels at the lateral ends thereof and a forwardly extending tongue rigid with the axle housing and generally centered thereon, the forward end of said tongue having a front pivot connection with the chassis, the rear portion of the axle assembly providing a rear pivot connection laterally centered on the axle housing, the front and rear pivot connections being of the ball and socket type defining a fore-and-aft extending roll axis, a rigid bracket extending downwardly from the chassis to a point adjacent the axle housing and substantially offset in the lateral direction from the roll axis, a horizontal transversely extending link having at least first and second spaced pivot points, the first pivot point being pinned to the lower end of the bracket and the second pivot point being pinned to the axle housing so that the axle assembly is restrained by the link from moving laterally with respect to the chassis while accommodating rolling movement of the axle assembly about the roll axis as the vehicle passes over irregular ground contours, and a single damped spring suspension device vertically adjacent the axle housing, the suspension device being connected at its upper end to the chassis and supportingly coupled at its lower end to the axle assembly at the roll axis so that the supportive effect of the suspension device is distributed evenly to both of the wheels, and auxiliary biasing spring means connected between the chassis and the axle assembly at a point eccentric to the roll axis for relatively biasing the axle assembly toward a centered position parallel to the chassis.

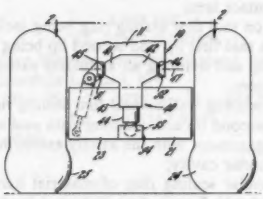


4,053,171

SPRING SUSPENSION ARRANGEMENT FOR OFF-ROAD VEHICLES

John H. Hyler, Peoria, Ill., assignor to Westinghouse Air Brake Company, Pittsburgh, Pa.

Filed Apr. 29, 1976, Ser. No. 681,515
Int. Cl.² B60G 21/00
U.S. Cl. 280—112 R 8 Claims



1. In a heavy duty suspension for an off-road vehicle, the combination comprising a chassis, an axle assembly below the chassis, the axle assembly including a transversely extending axle housing having wheels at the lateral ends thereof and a forwardly extending tongue rigid with the axle housing and generally centered thereon, the forward end of said tongue having a front ball and socket connection with the chassis, a single damped spring suspension device vertically arranged adjacent the axle housing and centered thereon, the suspension device being connected at its upper end to the chassis and at its lower end to the axle assembly so that the supportive effect of the suspension device is distributed evenly to both of the wheels, the suspension device being of "T" shape with the arms of the "T" including a hinge having a transversely extending axis at one end and having a ball and socket connection at its opposite end, the ball and socket connections together defining a fore-and-aft extending roll axis for accommodation of relative rolling movement while the transversely extending

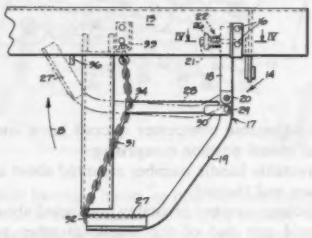
hinge provides rigidity against side forces to keep the suspension device in a generally centered working position, and auxiliary biasing spring means connected between the chassis and the axle assembly at a point eccentric to the roll axis for relatively biasing the axle assembly toward a position parallel to the chassis.

4,053,172

STEP ASSEMBLY FOR CONSTRUCTION VEHICLES

Randall D. McClure, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 3, 1975, Ser. No. 628,021
Int. Cl.² B60R *3/02*
U.S. Cl. 280—163 **16 Claims**



1. A step assembly for construction vehicles and the like comprising

a mounting bracket,

a support bracket comprising first and second members,

first pivot means pivotally mounting an upper end of the first member of said support bracket on said mounting bracket for permitting swinging movement of said first member relative to said mounting bracket,

second pivot means pivotally mounting an upper end of said second member on a lower end of said first member for permitting said second member to swing in a plane disposed transversely relative to a plane of swinging movement of said first member relative to said support bracket,

a first step mounted on a lower end of said second member,

a second step disposed vertically above said first step and attached to said second member, and

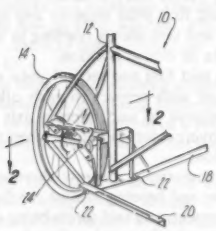
releasable detent means for normally holding said support bracket in a vertically disposed position and releasable upon application of a predetermined force imposed on said support bracket for swinging said support bracket relative to said mounting bracket.

4,053,173

BICYCLE

Douglas Chase, Sr., Rte. No. 3, Box 422, Cheboygan, Mich. 49721

Filed Mar. 23, 1976, Ser. No. 669,606
Int. Cl.² B62M *1/04*
U.S. Cl. 280—253 **9 Claims**



1. In a bicycle of the type having a frame, a front wheel and rear wheel rotatably secured to said frame, the improvement comprising:

a right and left elongated foot lever pivotally secured at one end to said frame,

a pivot rod pivotally connected to said frame and substantially parallel to the axis of rotation of said rear wheel,

means for rotating said pivot rod between a first and second rotational position in response to the alternate depression of said foot levers, and

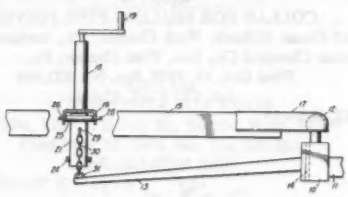
means for rotatably driving said rear wheel in response to the pivotal action of said pivot rod comprising an axle associated with the rear wheel and the rotation of which rotatably drives the rear wheel, a driven lever secured to and extending radially outward from said axle, a driving lever secured to and extending radially outward from said pivot rod, and a driving link having one end secured to said driving lever and its other end secured to said driven lever whereby rotation of the pivot rod from its first to its second rotational position effects a one half revolution of said axle while rotation of the pivot rod from its second to its first rotational position effects a one half revolution of said axle.

4,053,174

LOAD TRANSFERRING TRAILER HITCH DEVICE

Lawrence H. Guettler, Jr., P.O. Box 1695, Montgomery, Ala. 36108

Filed Sept. 7, 1976, Ser. No. 720,900
Int. Cl.² B60D *1/06*
U.S. Cl. 280—406 A **16 Claims**



1. In a load transferring trailer hitch having a resilient member which is tensioned to distribute trailer weight through the hitch on all wheels of the towing vehicle, the improvement comprising a jack means on the trailer having an engaging part which engages the resilient member to apply tension to the latter when the jack means is operated in one direction with the trailer and towing vehicle coupled through the hitch, and means interconnecting the resilient member and trailer and relieving the jack means of substantial forces transmitted through said resilient member during towing of the trailer.

4,053,175

PASSIVE SEAT BELT SYSTEM

Masumi Kato, Toyoake; Shigenori Kanazawa, Toyota, and Kiyomitsu Oshikawa, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Division of Ser. No. 595,319, July 11, 1975, Pat. No. 4,004,829. This application May 12, 1976, Ser. No. 685,709
Claims priority, application Japan, July 17, 1974, 49-82608; July 29, 1974, 49-86777; July 30, 1974, 49-87852
Int. Cl.² B60R *21/02*
U.S. Cl. 280—745 **6 Claims**

1. A passive seat belt system for a motor vehicle comprising:

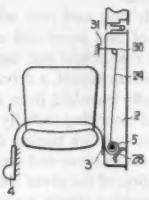
a belt coupled at its one end to a vehicle door and having inner thin space therein extending from said one end to the other end;

a seat belt retractor secured to a floor of a motor vehicle and having a retracting reel rotatably received therein for windingly retaining said belt and a coil spring coupled to

said retracting reel for normally biasing said reel in a belt retracting direction;

belt reinforcing means of flat strip type inserted at its one end into said inner thin space of said belt through an opening provided thereon;

reel means rotatably mounted in said vehicle door for windingly retaining said belt reinforcing means; and



driving means mounted in said vehicle door and coupled to said reel means for extending said belt reinforcing means when said vehicle door is opened, said belt reinforcing means extending through said inner thin space in accordance with the extension thereof driven by said driving means, and

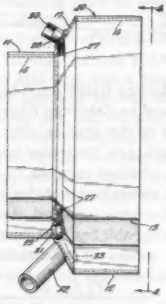
said driving means retracting said belt reinforcing means when said vehicle door is closed, and thereby said belt reinforcing means is retracted from said inner thin space.

4,053,176

COLLAR FOR SEALING PIPE JOINTS

Edward Oscar Hilbush, West Chester, Pa., assignor to West Chester Chemical Co., Inc., West Chester, Pa.

Filed Oct. 15, 1975, Ser. No. 622,696
Int. Cl.² F16L *55/00*
U.S. Cl. 285—15 **3 Claims**



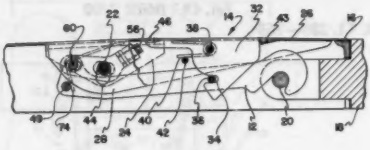
1. A molded flexible collar for sealing bell and spigot joints in pipes, said collar having a large sleeve to enclose the bell, a small sleeve to enclose the spigot, a connecting sleeve joining said large and small sleeves, the sleeves being integrally molded from an elastomeric material, a vent in said connecting sleeve for elimination of voids in the sealant by permitting gases to escape from the collar, a sealant inlet tube in said connecting sleeve circumferentially spaced from said vent, a dam secured to the inside of said connecting sleeve, said dam extending across the inside of said connecting sleeve and extending radially inward therefrom so that the top of said dam is spaced from the pipes to define a flow path between the pipes and said dam for the sealant to flow over said dam so that sealant flows in at least two circumferential directions about the collar with one direction of flow subject to a flow impediment caused by said dam, said inlet tube being circumferentially spaced from said dam and being connected to the collar so that sealant injected into the collar has a flow direction which is biased toward said dam.

4,053,177

ADJUSTABLE LATCH

John Creighton Stammreich, Buena Park, and Robert Dean Richter, Harbor City, both of Calif., assignors to Tridair Industries, Torrance, Calif.

Filed June 8, 1976, Ser. No. 694,002
Int. Cl.² E05C *19/14*
U.S. Cl. 292—113 **1 Claim**



1. An adjustable overcenter aircraft hook latch having an open and closed position comprising:

a. a pivotable handle member mounted about a fulcrum axis at one end thereof;

b. a latching member pivotably connected about a pivot axis at said one end of the handle member and extending toward the other end of said handle member when said latch is in its closed position;

c. said latching member having means at its extremity for engaging a keeper and slidable relative to said handle member;

d. adjusting means for adjusting said pivot axis relative to said fulcrum axis comprising a first yoke member mounted about said pivot axis, a second yoke member mounted about said fulcrum axis and cooperating with said first yoke member, and a driver for moving said yoke members relative to one another;

e. said handle member having an access opening in its outer face for the engagement of said driver by a drive tool when said latch is in its closed position;

f. said first yoke member being generally U-shaped with extending arms and a closed end portion, said arms mounted about said pivot axis through an opening therein, said fulcrum axis passing through slots in said first yoke member forward of said pivot axis, and the closed end portion of said first yoke member extending upwardly and forwardly above said fulcrum axis and terminating into a flat-bearing surface facing the access opening in said handle when the latch is in its closed position;

g. said second yoke member overlaying said first yoke member and being generally U-shaped with extending arms and a closed end portion, said second yoke member mounted about said fulcrum axis through an opening therein, said pivot axis passing through slots in the arms of said second yoke member rearwardly of said fulcrum axis, and the closed end portion of said second yoke member extending upwardly and forwardly above said flat bearing surface of said first yoke member and in alignment with said surface and said access opening in said handle when the latch is in its closed position;

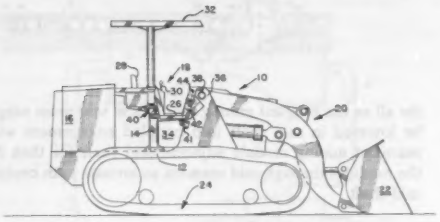
h. said slots in said first and second yoke members particularly arranged with respect to each other to guide said pivot axis relative to said fulcrum axis to maintain said latch in an overcenter condition when the latch is in its closed position;

i. said driver comprising a screw threaded to the second yoke member and bearing against the flat surface of said first yoke member, and said screw being in alignment with said access opening in said handle when the latch is in its closed position; and

j. said first yoke member, pivot axis and latching member

slidable relative to said second yoke member and fulcrum axis when said first yoke member is driven by said driver.

4,053,178
PLATFORM - OPERATOR TILTING RESILIENT MOUNTING FOR EARTHMOVING VEHICLES
Lyle E. York, Peoria, and Dale C. Brinkmann, East Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed Sept. 18, 1975, Ser. No. 614,812
Int. Cl.[2] B62D *27/06*
U.S. Cl. 296—28 C **10 Claims**



1. In a vehicle having a frame, an operator cab overlying the frame, and vehicle components underlying the cab when the cab is in an operating position relative to the frame, apparatus for moving the operator cab upward away from the frame to a maintenance position wherein the vehicle components are exposed, comprising:

means for mounting the cab to the frame for pivotal movement relative thereto about an axis adjacent one side of the cab; and

jack means for mechanically altering the pivotal position of the cab relative to the frame when an adjusting force is applied thereto, said jack means including

a pair of elongate members connected respectively to the frame and the cab spaced

from the axis, said members being aligned in telescoping relation for relative longitudinal movement, and

means interconnecting the members for applying a moving force therebetween to move the cab-connected member along the length of the frame-connected member in response to said adjusting force and for applying a frictional locking force between said members to frictionally lock said members against relative longitudinal movement whenever said adjusting force is not being applied,

said members being adjustable to pivot the cab to a maintenance position in which the center of gravity thereof is located on a side of the pivot axis whereat the weight of the cab applies a force to move said pair of elongate members apart, and said interconnecting means applies a bearing force which opposes the force of the cab weight.

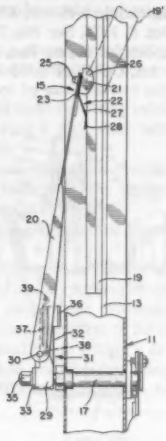
4,053,179
POSITIONING MEANS FOR A WINDSHIELD WIPER ARM ASSEMBLY
Stanley A. Jorgensen, Oswego, and Kenneth R. Myers, Aurora, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed Apr. 5, 1976, Ser. No. 673,504
Int. Cl.[2] B60S *1/34, 1/40*
U.S. Cl. 296—28 C **10 Claims**

1. A windshield wiper arm assembly comprising

a wiper arm adapted for mounting adjacent to a windshield, and adapted to receive a portion of a rock shaft for causing oscillation of said wiper arm about the axis of said rock shaft

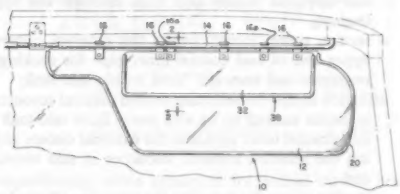
a blade pivotally mounted on an upper end of said wiper arm, said blade being pivotal around a pin means positioned so that the axis thereof is perpendicular to the axis of said rock shaft, and

positioning means comprising spring means having a first end thereof secured to an upper end of said wiper arm and a second end thereof engaging a lower end of said blade directly for biasing said blade outwardly away from said



wiper arm and toward said windshield and in a direction generally paralled to the axis of said rock shaft to maintain said blade at an acute angle relative thereto.

4,053,180
AUTOMOBILE SUN VISOR
Fred C. White, 1210 S. Bailey St., Seattle, Wash. 98108
Filed May 20, 1976, Ser. No. 688,353
Int. Cl.[2] B60J *3/02*
U.S. Cl. 296—97 K **4 Claims**



1. An automobile visor for reducing glare, comprising:

a horizontally disposed elongated rod mounted above the automobile windshield,

a transparent glare-reducing visor,

releasible means securing the visor to the rod for providing release of the visor from the rod during a forward impact on the visor,

said releasable securing means including a plurality of spaced curved friction clips each having an open end facing rearwardly and pressed over said rod whereby a forward impact on the visor will force open the open ends of the clips to release the visor from the rod,

an auxiliary transparent glare reducing plate releasibly secured to said rod with the auxiliary glare reducing plate adapted to overlie said visor in parallel relationship, and

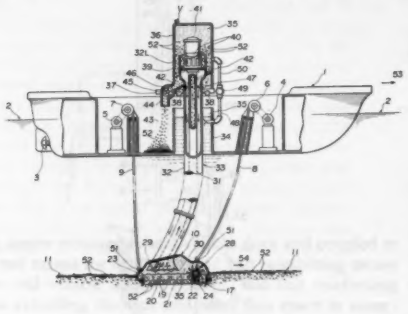
a plurality of similar clips mounting said glare reducing plate on said rod in a similar manner whereby a forward impact on the auxiliary glare reducing plate will force open the ends of the clips and the release of the plate from said rod.

4,053,181

SEABED MINING UTILIZING CIRCULATING CURRENT BASED ON WATER LEVEL DIFFERENCES

Nakaji Saito, 3-1, Higashijujo 6-chome, Kita, Tokyo, Japan

Filed Oct. 5, 1976, Ser. No. 729,734
Claims priority, application Japan, Jan. 20, 1976, 51-5583
Int. Cl.[2] E02F *3/88*
U.S. Cl. 299—9 9 Claims



1. Apparatus for sucking and extracting seabed mineral resources utilizing a circulating current based on the difference of water levels comprising:

a working ship traveling on an ocean and mounted at its upper portion with an external cistern containing seawater at a level higher than the level of seawater on the ocean;

a hollow box shaped tank having its bottom opened, sunk liftably into the sea bottom by a rope from said working ship, and having a rotatory driving mechanism for causing said tank to be trawled along the sea bottom while stirring it when said working ship travels on the ocean;

an elongated flexible coaxial pipe with both ends opened which includes an inner pipe and an outer pipe arranged coaxially with the inner pipe, the upper portion of which is disposed within the external cistern of said working ship, and which has an enlarged hopper mouth at its lower end disposed within said tank through the upper wall thereof;

a suction pump joined within the external cistern to the upper end of said coaxial inner pipe for sucking mineral resources and seawater from within said tank;

selection means for selecting seabed mineral resources out of seawater sucked up by said pump from said tank through said coaxial inner pipe into the external cistern and gathering the selected mineral resources in said working ship; and

returning means for bringing the seawater after selecting out the seabed mineral resources by said selection means back into said tank through a space defined by an outer wall of said coaxial inner pipe and an inner wall of said coaxial outer pipe utilizing the difference between the level of seawater contained in the external cistern and the level of seawater on the ocean.

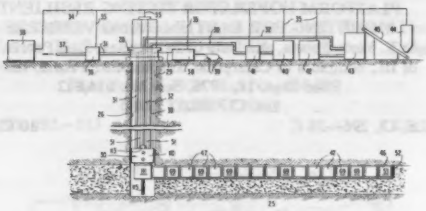
4,053,182

MINING METHOD AND APPARATUS

Rodney L. Nelson, Falls Creek, Pa., assignor to Ray M. Baughman, Dubois, Pa., a part interest

Division of Ser. No. 664,191, March 5, 1976. This application Oct. 5, 1976, Ser. No. 729,718
Int. Cl.[2] E21C *27/24, 41/00*
U.S. Cl. 299—19 26 Claims

1. Apparatus for mining solids from a subterranean seam containing minable solids through a prepared shaft extending from ground level into said seam comprising plural mining modules adapted to be placed one at a time in coupled relationship in said seam, a module placement and advancing unit adapted to be lowered through said shaft to said seam with each mining module and to force each module into said seam on a radial path away from said shaft while coupled with a module immediately ahead of it, and a rotational driving unit



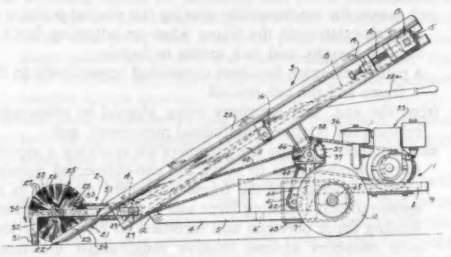
for all of the coupled mining modules in said seam adapted to be lowered in said shaft into coupled engagement with the rearmost mining module adjacent said shaft for then driving the modules through said seam on an arcuate path centered on said shaft.

4,053,183

APPARATUS FOR DISLODGING AND COLLECTING MATERIALS

John F. Probst, Hartland, Wis., assignor to P.A.L. Development Corporation, Butler, Wis.

Filed July 16, 1976, Ser. No. 705,761
Int. Cl.[2] E04D *15/00*
U.S. Cl. 299—36 12 Claims



1. A self-propelled apparatus for dislodging material from the surface and conveying the material for collection, comprising a self propelled vehicle including a frame, a scraping member extending transversely of the vehicle and mounted forwardly of the frame, said scraping member comprising a blade having a relatively sharp edge disposed to engage a surface as the vehicle is propelled to dislodge material from the surface, conveying means mounted on the frame and located to the rear of the scraping member in position to receive dislodged material from the scraping member and convey the dislodged material rearwardly to a position for collection, a brush having a plurality of flexible bristles and mounted adjacent to the forward edge of the scraping member, and means for rotating the brush whereby the brush will sweep dislodged material rearwardly across the scraping member to the conveying means.

4,053,184

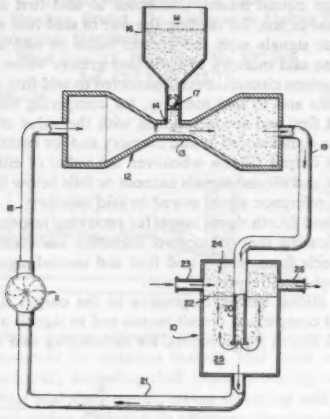
SOLIDS TRANSFER METHOD

Raymond W. Hiteshue, Bedford, Pa., assignor to Cities Service Company, Tulsa, Okla.

Filed July 30, 1975, Ser. No. 600,326
Int. Cl.[2] B65G *53/30*
U.S. Cl. 302—66 2 Claims

1. A method of introducing finely divided coal into a circulating liquid pressure system where the finely divided coal is

retained at atmospheric pressure and the system is under a pressure of at least 10 atmospheres, comprising the steps of introducing a Venturi tube, said tube having a throat of predetermined cross-section in the liquid system, pressurizing the system with a liquid flow so as to generate a negative pressure in the Venturi tube, providing an inlet port at the Venturi throat, introducing finely divided coal into the throat through said port so that negative pressure at the throat operates to



siphon finely divided coal into the system, wherein the liquid is a dense liquid having a density greater than the density of coal and immissible relative to the coal maintaining the system at a temperature sufficiently high to keep said dense liquid in a liquid state, transporting the coal and dense liquid to a separation chamber, separating the coal from the dense liquid while in said separation chamber by flotation, sweeping the coal from the separation chamber by a gaseous fluid into a reactor and recirculating said dense liquid.

4,053,185

DUAL BRAKING CORRECTION DEVICE

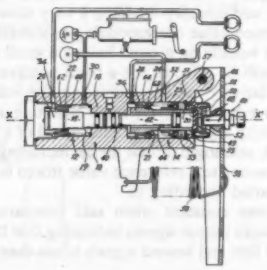
Jean Jacques Carre, Montreuil, France, assignor to Societe Anonyme D.B.A., Paris, France

Filed July 12, 1976, Ser. No. 644,690

Claims priority, application France, Jan. 17, 1975, 75.01423

Int. Cl.[2] B60T *8/18, 8/26*

U.S. Cl. 303—6 C **5 Claims**



1. A correction device for a vehicle braking system comprising:

a housing in which are disposed two correcting valves having inlet and outlet ports adapted to be separately connected to two independent sets of vehicle brake actuators respectively, each of said two correcting valves including a control piston slidably mounted in a bore, each of said control pistons being adapted to control communication between its corresponding inlet and outlet ports;

resilient means having a tension variable as a function of the load applied on the vehicle wheel axle associated with the vehicle;

force distributing means being provided for respectively transmitting to each of said control pistons, part of the force generated by said resilient means in the direction of opening of said two correcting valves, said force distributing means having a rigid shell with a cylindrical cavity located therein;

linkage means connected to said resilient means for transmitting an input force from the resilient means to said force distributing means;

a block of elastomeric material located within said cavity; and

a projection extending from each of said control pistons into said cavity and contacting said block, the area of the block face adjacent each of the projections being substantially equal to the sum of the areas of the contacting faces of said ends to hold said block within a deformable enclosure of constant volume and thereby transmit equal operational forces to said control pistons.

4,053,186

PROPORTIONAL VALVE APPARATUS FOR USE IN A REAR BRAKE SYSTEM OF A VEHICLE

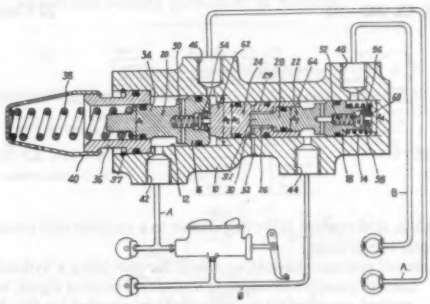
Dieter Jakobi, Brebach-Fechingen, Germany, assignor to The Bendix Corporation, South Bend, Ind.

Filed Mar. 26, 1976, Ser. No. 671,224

Claims priority, application Germany, June 4, 1975, 2524842

Int. Cl.[2] B60T *8/18, 8/26*

U.S. Cl. 303—6 C **8 Claims**



4. Proportioning valve apparatus for a dual circuit brake system, said apparatus comprising:

a housing having a bore closed at one end;

a first movable proportioning piston slidably disposed in said bore having a head portion and a rod portion, said rod portion having an area in section smaller than that of said head portion;

a first output chamber established by the extremity of the head portion of the first piston and the closed end of the bore, said first output chamber being in communication with a first outlet port of the housing;

an intermediate piston being disposed in said bore;

said intermediate piston having a recess for receiving the rod portion of the first piston, said recess being vented to the atmosphere;

a first inlet chamber communicating with a first inlet portion of the housing being established by the intermediate piston and the head portion of the first piston;

a second movable porportioning piston slidably disposed in an enlarged diameter portion of said bore, said second movable porportioning piston having a head portion and a rod portion, the rod portion of the second movable por-

portioning piston having an area in cross section smaller than that of the second head portion;

a second output chamber established by the other end of the intermediate piston and the extremity of the head portion of the second piston in communication with a second outlet port of the housing;

closing means cooperating with the rod portion of the second piston for sealing said bore;

a second inlet chamber established by said closing means and the head portion of the second piston in communication with a second inlet port of the housing;

valve means located in each head portion of the first and second proportioning pistons for respectively controlling the fluid passage between the first and second inlet and outlet chambers;

first resilient means for urging said second piston toward said first piston; and

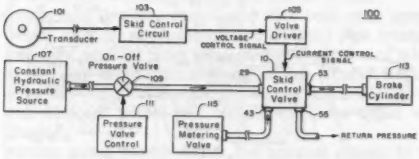
second resilient means having a load lower than said first resilient means being disposed between the closed end of the bore and the head portion of the first piston for urging said first rod portion into engagement with said intermediate piston to provide simultaneous movement of said first and second pistons in response to presentation of first and second fluids to said first and second inlet ports and thereby permit said valve means to simultaneously allows said first and second fluid to be communicated to said first and second outlet ports.

4,053,187

SINGLE GAIN SKID CONTROL VALVE AND SKID CONTROL SYSTEM

Robert D. Cook, Valencia, Calif., assignor to Crane Co., Chicago, Ill.

Filed Nov. 16, 1976, Ser. No. 742,251
Int. Cl.² B60T 8/02
U.S. Cl. 303—93 **22 Claims**



13. A skid control valve responsive to a variable skid control signal, comprising:

control pressure generating means for providing a hydraulic control pressure in response to the skid control signal, said control pressure being exclusively controlled by the skid control signal and having a level which is a predetermined function of the skid control signal; and

brake pressure valving means for accepting a metered hydraulic fluid pressure and for comparing the metered pressure with said control pressure and for producing a hydraulic brake pressure which is determined by the lower of either said control pressure or said metered pressure.

4,053,188

CIRCUIT ARRANGEMENT FOR ANTILOCKING CONTROL SYSTEM

Wolf-Dieter Jonner, Sandhausen, Germany, assignor to Teldix GmbH, Heidelberg, Germany

Filed Dec. 22, 1976, Ser. No. 753,426
Claims priority, application Germany, Dec. 24, 1975, 2558712
Int. Cl.² B60T 8/10
U.S. Cl. 303—96 **15 Claims**

1. For use in an antilocking control system for the wheel brakes of a vehicle wherein signals dependent on the rotational behavior of the wheels of the vehicle are evaluated to produce control signals, including slip signals, for controlling control members associated with the wheel brakes of the vehicle to vary the brake pressure, a circuit arrangement for providing a reference value for generating the slip signals comprising in combination:

a memory for storing said reference value;

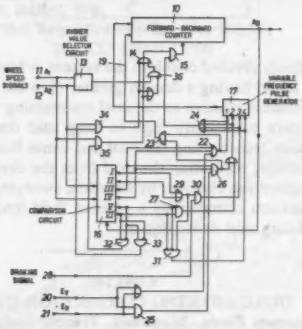
first and second signal inputs for receiving respective first and second input signals whose values are dependent on the respective rotational speeds of two different wheels of the vehicle;

selector circuit means, connected to said first and second signal inputs, for feeding the one of said first and second input signals with the greater value to said memory to cause said memory to store said greater value;

comparison circuit means, connected to said first and second inputs and to said memory, for comparing the values of said first and second signals with the value of the reference signal stored in said memory and for emitting respective output signals whenever the value of either of said first and second signals exceeds or falls below the value of the reference signal stored in said memory;

third and fourth signal inputs for receiving respective signals indicating that the control members associated with the wheels from which said first and second signals are derived have responded; and

logic circuit means, responsive to the output signals from said comparison circuit means and to signals at said third and fourth signal inputs, for controlling said memory to



cause said reference value stored in said memory to be selectively varied according to either a first negative time constant for rapidly decreasing the value in said memory whereby a very rapid matching of a higher reference value to the rotational speed of the wheel will be effected, a second negative time constant for very slowly reducing the value in said memory whereby a very slow reduction in the reference value corresponding to a decrease in the speed of the vehicle on ground having a small coefficient of friction will be effected, or a third positive time constant for relatively rapidly increasing the value in said memory whereby a relatively rapid matching of the reference value with a greater rotational speed of a wheel will be provided; said logic circuit means including switching means for causing said reference value stored in said memory to be varied according to

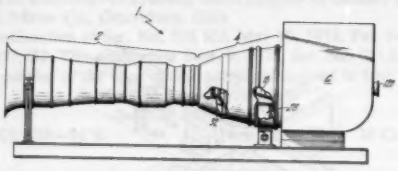
a. said first time constant when said comparison circuit means produces output signals indicating that the value of both of said first and second signals is less than said reference value;

b. said second time constant when said comparison circuit means produces output signals indicating that the value of both of said first and second signals is less than said reference value and signals are present at said third and fourth signal inputs indicating that both control members have responded; and

c. said third time constant when said comparison circuit means produces output signals indicating that the value of

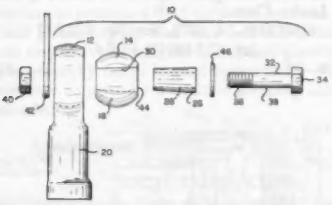
at least one of said first and second signals is greater than said reference value.

4,053,189
TURBINE CONSTRUCTION
Rudolph J. Novotny, Stuart, Fla., assignor to United Technologies Corporation, Hartford, Conn.
Filed June 17, 1976, Ser. No. 697,096
Int. Cl.² F16C 35/00
U.S. Cl. 308—26 10 Claims



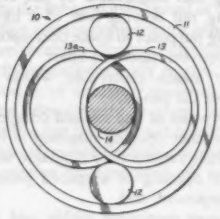
1. A turbine power assembly comprising a case, a rotor assembly mounted for rotation therein, said rotor assembly having a forwardly extending shaft means, a bearing assembly for supporting said shaft means, means mounting said bearing assembly comprising a diaphragm positioned therearound, said diaphragm having an inner periphery and an outer periphery, the inner periphery of said diaphragm being fixed to said bearing assembly, an annular passageway located between said bearing assembly and case, vanes in said passageway, the outer periphery of said diaphragm being connected to the inner ends of said vanes, a cylindrical member, said cylindrical member having one end connected to the case, said vanes having their outer ends fixed to said cylindrical member.

4,053,190
SELF-ALIGNING BEARING WITH A SPLIT INNER MEMBER
Albert R. McCloskey, Fairfield, Conn., assignor to The Heim Universal Corporation, Fairfield, Conn.
Division of Ser. No. 589,201, June 23, 1975, Pat. No. 4,024,616.
This application Sept. 22, 1975, Ser. No. 615,624
Int. Cl.² F16C 23/08
U.S. Cl. 308—72 15 Claims



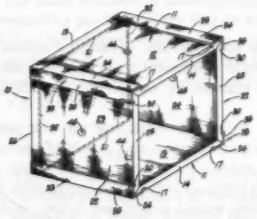
1. A self-aligning bearing assembly comprising an outer member having a concave inner surface and an inner member operationally carried within said outer member and having a convex outer surface generally complementary to said concave inner surface, said inner member being split to provide a departure wherein said inner member is provided with a tapered hole therethrough, said departure being tangential to a central hole provided in said inner member.

4,053,191
ROLLING CONTACT SPRING BEARINGS
Earl W. Traut, 8040 Palm Lake Drive, Orlando, Fla. 32811
Filed Nov. 3, 1975, Ser. No. 628,350
Int. Cl.² F16C 19/20, 19/40, 19/56
U.S. Cl. 308—206 9 Claims



1. A rolling contact bearing comprising:
an outer race,
an inner race,
rotating roller means,
said rotating roller means being located between said outer race and said inner race and including a plurality of rollers,
rotating ring means,
said rotating ring means being located between said outer race and said inner race and including a plurality of rings,
said rotating ring means being in rolling contact with at least one of said races, so as to transfer at least part of the bearing load therethrough,
said rollers and said rings being alternately interposed between and holding each other in position.

4,053,192
MODULAR FURNITURE
Norman Spetner, 7108 Delmar Blvd., St. Louis, Mo. 63130
Filed Jan. 9, 1976, Ser. No. 647,940
Int. Cl.² A47B 87/00
U.S. Cl. 312—107 3 Claims



1. A modular furniture combination comprising:
a. a plurality of stacked components each including:
1. a plurality of stached components each including:
I. a substantially flat outer face having a pair of parallel side margins and associated parallel grooves disposed adjacent said margins said face being planar on each side of said grooves, and
II. a substantially flat inner face having a pair of parallel chamfered side edges and a perpendicular groove extending therebetween said chamfered edges being engageable with the chamfered side edges of an adjacent panel,
2. a plurality of identical elongate rails interconnecting adjacent panels, each rail including:
I. angularly related outstanding legs having transversely related, lengthwise extending lips receivable

within associated outer face grooves of adjacent panels to form a corner between said panels, and

II. each of said legs having an inner face engageable with an associated panel planar outer face and an outer face disposed in a plane spaced from the plane of said panel outer face to provide an outstanding bearing seat engageable by the corresponding outstanding rail bearing seat of a like component for stacking purposes to space corresponding panel outer faces between said rails apart.

3. stiffener means receivable within said inner face grooves of the panels,

b. at least one panel of one stacked component including at least one fastener opening disposed in the panel area between the rails substantially alignable with a corresponding fastener opening of a spaced panel of an adjacent stacked component, and

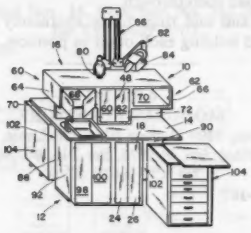
c. fastener means receivable within said fastener openings and extending between the spaced apart outer surfaces of said corresponding panels of like stacked components tending to urge said spaced panels toward each other and connect said stacked components.

4,053,193

ROOM DIVIDER AND CABINET STRUCTURE FOR DENTAL EQUIPMENT

Richard K. Grover, and Robert H. Larsen, both of Box 254, Grandville, Mich. 49418

Filed Mar. 29, 1976, Ser. No. 671,677
Int. Cl.² A61C *19/02*; A47B *77/08*
U.S. Cl. 312—209 **8 Claims**



1. A dental room divider permitting access to and use of a variety of dental equipment from opposite sides of the divider and thereby eliminating equipment duplication, said divider comprising:

a central enclosure including an elongated horizontally extending countertop and a pair of spaced vertically extending sidewalls supporting said countertop, said countertop extending outwardly beyond each of said sidewalls;

a first access means positioned below said countertop for permitting access to said central enclosure from one side thereof;

a second access means positioned below said countertop opposite said first access means for permitting access to said central enclosure from the other side thereof;

an upper, generally T-shaped enclosure including a pair of spaced vertically extending sidewalls and a pair of outwardly extending wing enclosures supported by said countertop and dividing said countertop into two mirror image, dental operatory work areas on opposite sides of said upper enclosure and extending longitudinally of said countertop, each side of said upper enclosure further including access means secured thereto for permitting access to the interior of said enclosure from opposite sides thereof;

a pair of vertical divider walls positioned on said countertop adjacent the longitudinally centerline thereof and extending outwardly from and perpendicular to the sidewalls of said upper enclosure to a point adjacent the ends of said countertop thereby isolating said dental work areas; and

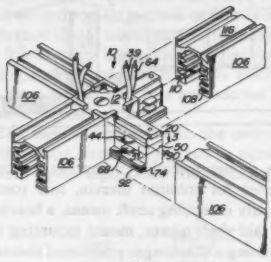
means disposed within one of said enclosures for slidably mounting a piece of dental equipment for movement to either side of said enclosure whereby said equipment may be used by a dentist positioned on either side of said dental room divider.

4,053,194

ELECTRICAL JUNCTION ASSEMBLY

Lester Gilman, Southampton, Pa., assignor to Kidde Consumer Durables Corporation, Bala Cynwyd, Pa.

Filed May 3, 1976, Ser. No. 682,938
Int. Cl.² H01R *9/00*
U.S. Cl. 339—21 R **12 Claims**



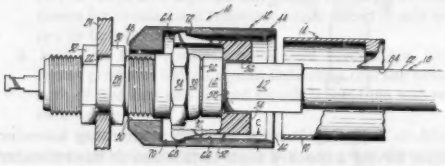
1. An electrical junction assembly for electrically coupling mating bus bars of two adjacent tracks comprising a non-conductive body portion having at least two integral legs, a ground overlying a part of said body portion, at least two mating distributor members of electrically conductive material, each distributor member having a body and at least two flanges generally perpendicular to a plane of the body, each flange having at least one leg, each flange leg being integral in one piece with and extending from one end of its associated flange, each flange leg having a tab lying generally perpendicular to its leg and generally parallel to its associated body, said two distributor members being arranged in a set with a non-conductive spacer therebetween so that the tabs of a pair of legs extending outwardly away from each other beyond opposite side faces of each of said body portion legs, and means coupling said components into an assembled relationship.

4,053,195

THEFTPROOF CONNECTOR ASSEMBLY

Eric W. Laverick, South Nashua, N.H., and Allen I. Horowitz, Windsor Locks, Conn., assignors to Hi-G Incorporated, Windsor Locks, Conn.

Filed Oct. 14, 1975, Ser. No. 621,872
Int. Cl.² H01R *13/54*
U.S. Cl. 339—37 **16 Claims**



1. For protecting a coaxial cable connection to a use device, a theftproof assembly comprising a connector including a coupling for connecting a coaxial cable to the use device, a housing for the coupling, the housing having an open end for receiving the coupling, an end cap for enclosing the open end

of the housing and protectively shielding the coupling within the housing, the cap having an end wall with an opening of enlarged size relative to the cable but of reduced size relative to the coupling permitting the cap to be fitted over the cable and inserted into the housing by manually sliding the cap over the cable into the open end of the housing, the housing and cap having recess means and complementary projection means movable into interlocking engagement, upon inserting the cap into the housing, for securing the housing and cap in locked assembly with the coupling protectively isolated within the surrounding confines of the assembly.

4,053,196

SUBMERSIBLE ELECTRIC MOTOR AND ELECTRICAL CONNECTOR ASSEMBLY

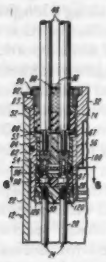
Louis R. Dunaway, Gettysburg, Ohio, assignor to Century Electric Motor Co., Gettysburg, Ohio

Continuation of Ser. No. 578,532, May 19, 1975, Pat. No. 3,997,232. This application Sept. 9, 1976, Ser. No. 721,827

The portion of the term of this patent subsequent to Dec. 14, 1993, has been disclaimed.

Int. Cl.[2] H01R *13/52*

U.S. Cl. 339—94 R **10 Claims**



1. In a submersible electric motor including a housing enclosing a stator and a rotor having a shaft supported by bearing means, an improved electrical connector assembly for coupling to said motor a power supply lead wire having an end portion projecting from surrounding insulation, said connector assembly comprising means connected to said housing and defining a bore, an electrically conducting socket member, electrical insulator means within said bore for supporting said socket member, a resilient gland member disposed within said bore and having means defining an opening for receiving said insulation on said power supply lead wire, said socket member having means defining an opening for receiving the exposed end portion of said power supply lead wire, means for electrically connecting said socket member to a stator wire within said housing, means for compressing said gland member in an axial direction to produce a fluid-tight seal between said insulation of said power supply lead wire and said motor housing, and means responsive to compression of said gland member for exerting a generally radial inward compression force on said socket member to produce a positive gripping action by said socket member.

4,053,197

ELECTRICAL CONNECTOR

Vladimiro Teagno, Turin, Italy, assignor to AMP Incorporated, Harrisburg, Pa.

Filed July 30, 1976, Ser. No. 709,980

Claims priority, application United Kingdom, Aug. 2, 1975, 32385/75

Int. Cl.[2] H01R *11/20*

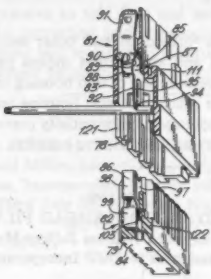
U.S. Cl. 339—99 R **4 Claims**

1. An electrical connector assembly comprising:

a. a first housing of insulating material having a plurality of side walls forming at least one passageway opening into a forward mating end, said mating end having at least one inwardly, projecting elongated rib on one interior side wall surface, and at least one wire-receiving slot in a side wall in general alignment with the passageway;

b. at least one conductive male terminal positioned in the passageway in the first housing, said terminal having a body section with a wire-connecting portion at one end extending into the forward mating end of the housing, said wire-connecting portion comprising a generally planar tab having a wire-receiving groove extending from its free end rearwardly toward the body section;

c. a second housing of insulating material having one end adapted to be telescopingly received into the forward mating end of the first housing, said one end having on the exterior surface of one wall at least one channel positioned to slidingly receive the elongated rib positioned in the



forward mating end so as to guide the housings together, further, said second housing having at least one passageway therethrough, said passageway in said second housing being in alignment with the passageway in the first housing; and

d. at least one conductive female terminal positioned in the passageway of the second housing, said female terminal having on one end a wire-connecting portion comprising a web with arms extending laterally along either side to provide a tab receiving cavity, so that as the first and second housing are mated together, the wire-connecting portion on the male terminal is telescopingly received in the wire-connecting portion on the female terminal and a wire which may be inserted into the wire-connecting slot in the first housing in front of the male terminal is bent by the tab and web and crimped longitudinally in between the groove and the web.

4,053,198

ELECTRICAL CONNECTOR MEANS

Richard C. Doyle, Greenlawn, and James E. Meehan, Levittown, both of N.Y., assignors to Slater Electric Inc., Glen Cove, N.Y.

Filed Apr. 23, 1976, Ser. No. 679,785

Int. Cl.[2] H01R *13/58*

U.S. Cl. 339—103 R **32 Claims**

1. Connector means adapted to be coupled to the end of a cable, which comprises:

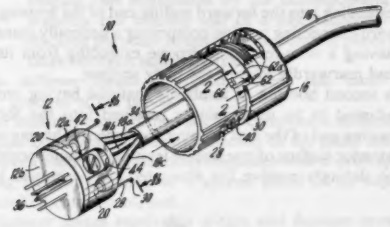
a generally cylindrical connector housing member, said housing member being generally hollow and adapted to receive said cable and a connector body, and having thread means formed substantially at one end;

a generally cylindrical collar member, said collar member being generally hollow to receive said cable and having reciprocating thread means for threadably engaging said thread means on said connector housing;

grasping means positioned between said housing and collar members when said members are threadably engaged, said grasping means adapted to securely engage said cable as

said collar and housing members are threadably engaged by relative rotation therebetween;

detent means formed on one of said housing and collar members, said detent means adapted to project towards the other of said housing and collar members;



buttressing means formed on said other member, said buttressing means and said detent means proportioned to allow threadable coupling of said housing and collar members by relative rotation of said housing and collar members in one direction, but substantially prevent decoupling by simply reversing said relative rotation.

4,053,199

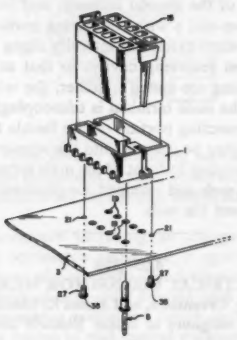
CABLE CONNECTABLE BULKHEAD FILTER ARRAY

Robert David Hollyday, and William Jeffrey Hudson, Jr., both of Hershey, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 555,657, March 5, 1975, abandoned, which is a continuation-in-part of Ser. No. 423,944, Dec. 12, 1973, abandoned. This application Dec. 15, 1975, Ser. No. 641,196

Int. Cl.² H01R *25/02*

U.S. Cl. 339—147 R **1 Claim**



1. A filter array comprising a printed circuit board, a pin, a filter sleeve joined electrically over said pin, said pin and said filter being retained in said printed circuit board, said pin having a portion projecting outwardly of said printed circuit board, a first housing mounted on said printed circuit board and encircling said filter and said pin, a second housing coupling with said first housing and capable of being uncoupled therefrom, an electrical receptacle contained in said second housing and removably coupled to the projecting portion of said pin, a bottom wall of said first housing in spaced relationship from said printed circuit board, and an aperture in said bottom wall encircling said filter and said pin, said aperture being larger than said filter and said pin, said bottom wall thereby being spaced from said filter and said pin to prevent transmission of stresses to said filter and said pin upon coupling or uncoupling said first and second housings.

4,053,200

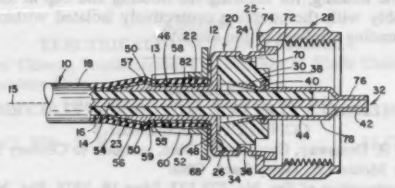
CABLE CONNECTOR

Stephen William Pugner, Bethel, Conn., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Nov. 13, 1975, Ser. No. 631,453

Int. Cl.² H01R *17/04*

U.S. Cl. 339—177 R **39 Claims**



1. An electrical connector assembly for connection to a coaxial cable including outer cable material having an outer conductor with an inner surface portion, an inner conductor, and an insulating member separating said outer and inner conductors, comprising

a connector housing including a rear tubular conductive member extending along a longitudinal axis and having an outer peripheral surface portion dimensioned for engagement with the inner surface portion of the outer conductor and an inner passageway dimensioned for receiving the inner conductor and insulating member,

contact means mounted in said housing, first and second shoulders on said rear tubular conductive member spaced apart longitudinally and separated by and extending radially from said outer peripheral surface portion, and

an elongate sleeve member for disposition about the cable at a position over said outer peripheral surface portion and including a rigid closed section and inwardly resilient section dimensioned for normally pressing against the outer material of the cable to urge said outer conductor against said outer peripheral surface portion and outwardly expandable to move axially over one of said shoulders to reach said position over said surface portion, the ends of said sleeve and said shoulders cooperable through the intervening cable material to hold said sleeve in axial retention and prevent retrograde movement of the cable.

4,053,201

ELECTRIC CABLE CONNECTION ADAPTED FOR HIGH EXTERNAL PRESSURES

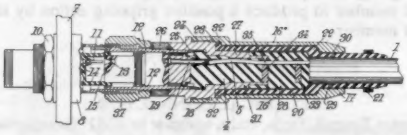
Rene Gabriel Grappe, Paris, France, assignor to Societe Souriau et Cie, France

Filed Feb. 6, 1976, Ser. No. 656,128

Claims priority, application France, Feb. 14, 1975, 75.04680

Int. Cl.² H01R *13/40*

U.S. Cl. 339—218 R **16 Claims**



1. In an electrical cable connector assembly which is particularly adapted for electrical cables subjected to very high external pressures, which is disposed between a connector member and the terminal end of the electrical cable, and which includes an insulator that fills an inner connector chamber wherein sheathed conductors of the cable are connected with electrical contacts of the connector member, the improvement wherein said insulator comprises a deformable, resilient material which

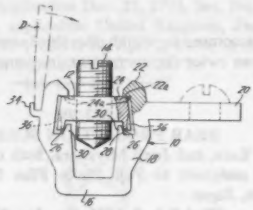
surrounds the sheathed conductors of the electrical cable and wherein said assembly includes means providing communication of the external pressure acting on the assembly with said insulator material through the outer wall of the assembly.

4,053,202

LAY-IN CONNECTORS

Alexander R. Norden, 350 Central Park West, New York, N.Y. 10025

Filed Apr. 27, 1976, Ser. No. 680,739
Int. Cl.² H01R 7/08
U.S. Cl. 339—272 UC **14 Claims**



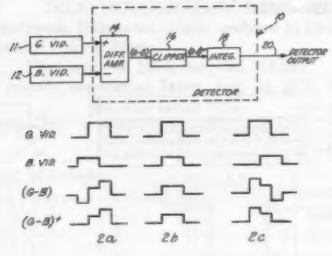
1. A lay-in connector including a resilient first member having a base portion and two opposite and spaced-apart walls upstanding integrally from said base portion, said walls having inward projecting overhangs spaced from said base portion, a screw-threaded second member removably received between said walls and having marginal portions underlying said overhangs, said second member being movable along the overhangs for removal from said first member, and a screw extending through said second member for tightening a conductor in place in said first member, the overhangs cooperating with the second member for resisting displacement of the latter away from said base portion when the screw is tightened, said walls having a first pair of ribs projecting upward between said base portion and said overhangs, and said second member having a second pair of ribs projecting downward and flanking said first pair of ribs, respectively, for resisting outward bulging of the walls when outward pressure is developed against the walls by one or more conductors tightened in place between the walls by the screw.

4,053,203

AUTOMATIC CENTERING

John F. Monahan, Quincy, Ill., assignor to Harris Corporation, Cleveland, Ohio

Filed Dec. 22, 1975, Ser. No. 643,169
Int. Cl.² H04N 9/16
U.S. Cl. 358—51 **17 Claims**



1. Automatic centering apparatus for use with a video camera having means for providing at least first and second video signals and means responsive to a registration control signal for adjusting the registration of said signals, said centering apparatus comprising:

first delay means responsive to said first video signal for delaying said signal by a first amount to provide a first delayed signal;

second delay means responsive to said second video signal for delaying said signal by a second amount substantially twice the length of said first amount to provide a second delayed signal;

detector means comprising signal subtractor means for differentially combining said second video signal and said first delayed signal to provide a first difference signal and similarly combining said second delayed signals and said first delayed signal to provide a second difference signal, signal clipper means responsive to said first and second difference signals for selectively limiting the amplitudes thereof to respectively provide first and second clipped signals, and integrator means responsive to said first and second clipped signals for respectively integrating the amplitudes thereof to provide first and second detector output signals; and,

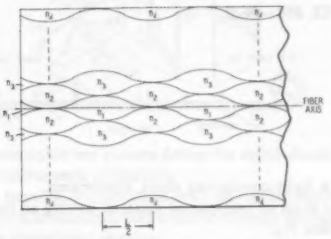
means responsive to said first and second detector output signals for providing said registration control signal and for changing said registration control signal in response to the difference between said detector output signals.

4,053,204

OPTICAL FIBER HAVING REDUCED DISPERSION

Stewart Edward Miller, Locust, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 30, 1976, Ser. No. 710,136
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 GN **6 Claims**



1. A graded index optical fiber having decreased optical dispersion comprising a core member and a cladding surrounding said core member, said core member including a plurality of layers, the refractive indices of which radially decrease from a maximum at the center of the fiber, characterized in that

the thickness of each of said layers has spatial fluctuations along the longitudinal axis of said fiber, said fluctuations occuring slowly, the thickness of each layer varying between maximum and minimum values with the minimum thickness of each of said layers being proximate to zero.

4,053,205

OPTICAL FIBER HAVING REDUCED DISPERSION

Stewart Edward Miller, Locust, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

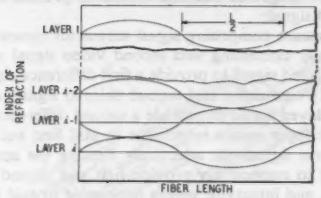
Filed July 30, 1976, Ser. No. 710,137
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 GN **6 Claims**

1. A graded index optical fiber having decreased optical dispersion comprising a core member and a cladding surrounding said core member, said core member including a plurality of layers the refractive indices of which radially decrease from a maximum at the center of the fiber

CHARACTERIZED IN THAT

the index of refraction of each of said layers has spatial fluctuations along the longitudinal axis of said fiber, the fluctuations in the refractive index of each layer occuring

slowly, the minimum refractive index of each layer being proximate in value to the maximum index of the radially next furthermost adjacent layer, and the maximum refractive index of each layer being proximate in value to the minimum index of the radially more central adjacent layer.



4,053,206

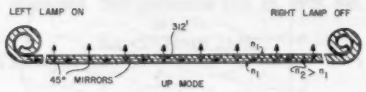
MULTIPLE FUNCTION RECORDING AND READOUT SYSTEM

George Johannus Yevick, Leonia, N.J., assignor to Personal Communications, Inc., Stamford, Conn.

Division of Ser. No. 515,344, Oct. 16, 1974, Pat. No. 4,007,958. This application Aug. 12, 1976, Ser. No. 713,770

Int. Cl.² G02B 5/14

U.S. Cl. 350—96 R 3 Claims



1. A light-conducting sheet, comprising,

a. a sheet of transparent material having an index of refraction N_2,

b. a first coating on both sides of said sheet having an index of refraction N_1 less than N_2,

c. said sheet having a plurality of light-conducting channels over its surface,

d. a reflector positioned in each said channel at approximately 45°, whereby light passing along one of the channels is reflected out from the channel in a direction normal to the sheet, said reflectors being positioned over the surface of said sheet,

e. a second, opaque coating on both sides of said sheet and superposed on said first coating, said opaque coating being apertures on both sides at the said reflectors, and also being apertured on both sides adjacent each said reflector.

4,053,207

ELECTRO-OPTIC DEVICES

Edward T. Keve, Warlingham, and Keith L. Bye, Reigate, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

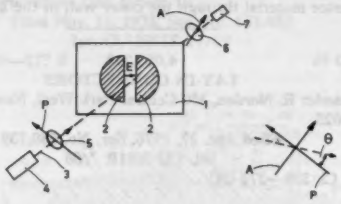
Filed May 19, 1976, Ser. No. 688,066

Claims priority, application United Kingdom, June 9, 1975, 24622/75

Int. Cl.² G01B 1/00

U.S. Cl. 350—150 6 Claims

1. An electro-optic device including a platelet of a ferroelectric ceramic material having an electric field-dependent birefringence value and the individual grains of which have a domain structure, in which the thickness of the platelet is smaller than twice the average grain diameter of the material.



4,053,208

REAR PROJECTION SCREENS

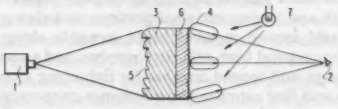
Hisatoyo Kato, and Junji Miyahara, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Feb. 3, 1976, Ser. No. 654,830

Claims priority, application Japan, Feb. 3, 1975, 50-14541

Int. Cl.² G03B 21/56

U.S. Cl. 350—117 21 Claims



1. A rear projection screen comprising a diffusion layer containing at least one light scattering material selected from the group consisting of wax and crystalline polymers wherein a micro-optical surface irregularity is provided directly on at least one side of said diffusion layer.

4,053,209

ELECTROCHROMIC DEVICE

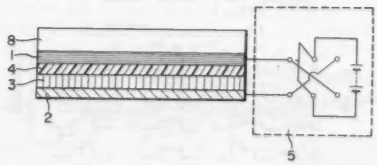
Toshitami Hara, Tokyo; Yoshioki Hajimoto, Chofu; Yoshiaki Shirato, and Masaaki Matsushima, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 26, 1975, Ser. No. 635,427

Claims priority, application Japan, Nov. 27, 1974, 49-136847; Apr. 4, 1975, 50-40910; July 9, 1975, 50-84076; June 23, 1975, 50-77185; June 18, 1975, 50-73854

Int. Cl.² G02F 1/16

U.S. Cl. 350—160 R 28 Claims



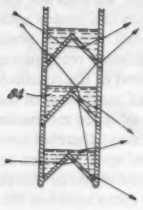
1. An electrochromic device comprising a pair of opposed electrodes, at least one of which is light transmissive, having disposed therebetween a laminated electrochromic layer consisting essentially of a metal oxide selected from the group consisting of WO_3, MoO_3 and TiO_2, and a laminated auxiliary electrochromic layer consisting essentially of a compound of a metal; wherein said metal oxide and said metal compound are

selected such that the difference in electronegativity between the metal of said metal oxide and a metal of said metal compound is not greater than 0.4; and wherein said metal compound is selected from the group consisting of ZrO_2, Ta_2O_5, Nb_2O_5, V_2O_5, TiO_2, $BaTiO_3$, $CaTiO_3$, $SrTiO_3$, Y_2O_3-containing ZrO_2, AgI, Ag_2S, AgSI, Ag_3SBr, $Ag_6I_4WO_4$, and mixtures thereof.

4,053,210
TRANSLUCENT BUILDING BLOCKS

Maximilian Gustav Alfred Cecil Michaelis, 13 Quai St. Michel, Paris V, France

Continuation-in-part of Ser. No. 445,699, Feb. 25, 1974, Pat. No. 3,954,326. This application Dec. 27, 1974, Ser. No. 537,008
Claims priority, application United Kingdom, Jan. 3, 1974, 273/74; Jan. 25, 1974, 41576/74; Apr. 2, 1974, 41786/74; Apr. 30, 1974, 41977/74; Sept. 17, 1974, 43428/74
Int. Cl.² E04C *1/42*
U.S. Cl. 350—262 9 Claims

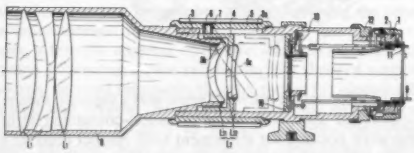


1. In an article of manufacture in the form of a hollow translucent block having substantially vertical and substantially parallel side walls connected to substantially vertical and substantially parallel end walls, said side walls being longer than said end walls, said side walls and said end walls being connected to a bottom wall, the improvement comprising said bottom wall being defined by at least two oblique portions each forming an acute angle with respect to said side walls, said oblique portions having smooth upper and lower surfaces, said oblique portions converging to a ridge within said block, each side wall cooperating with the adjacent one of said oblique portions to form first and second trough portions, at least one of said trough portions being at least partially filled with a transparent liquid such that said liquid cooperates with the oblique portions with which it is in contact to transmit at least some light incident on said side walls through said block by total internal reflection and refraction.

4,053,211
FOCUS ADJUSTING DEVICE FOR TELEPHOTOGRAPHIC LENS

Kikuo Momiyama, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 16, 1976, Ser. No. 714,597
Claims priority, application Japan, Aug. 20, 1975, 50-101617
Int. Cl.² G02B *7/02*
U.S. Cl. 350—255 2 Claims



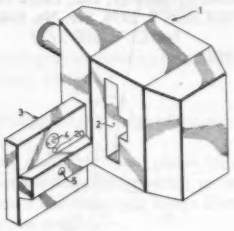
1. In a telephotographic lens of a type to move a part of the lens system thereof for focusing, a focus adjusting device comprising;

a movable lens which is movably held along an optical axis;
an operating member which is rotatable for focusing; and
a nonlinear cam means which moves said movable lens in response to the rotation of the operating member, the nonlinear cam means being provided with a cam face which is shaped in such a manner as to move the movable lens to a relatively shorter extent for focusing on an object to be photographed located at a greater distance in response to a given angle of rotation of the operating member and to a relatively greater extent for focusing on a object to be photographed located at a shorter distance in response to the given angle of rotation of the operating member.

4,053,212
TEST DISK FOR EYE EXAMINATION

Otwald Teichner, Wolfratshausen, and Manfred Born, Munich, both of Germany, assignors to Optische Werke G. Rodenstock, Germany

Filed Oct. 17, 1975, Ser. No. 623,473
Claims priority, application Germany, Oct. 31, 1974, 2451750
Int. Cl.² A61B *3/02*
U.S. Cl. 351—32 10 Claims



1. An exchangeable test pattern device for ophthalmological examination instruments comprising

a cassette housing for insertion into an ophthalmological examination instrument, said cassette housing including at least one transparent portion,
a disk rotatably mounted in said cassette housing, said disk including a plurality of test patterns, each of said test patterns being selectively visible at said transparent portion, and
means for rotating said disk.

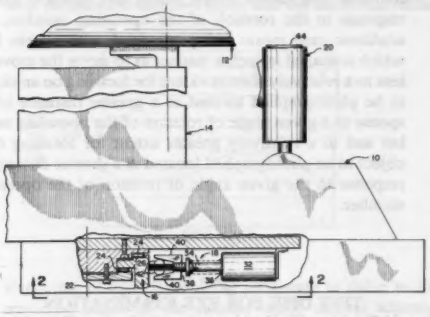
4,053,213
SUPPORT FOR AN OPHTHALMIC INSTRUMENT

Donn E. Stevens, Rochester, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Sept. 13, 1976, Ser. No. 722,953
Int. Cl.² A61B *3/00*; B60T *13/04*
U.S. Cl. 351—38 3 Claims

1. An ophthalmic instrument support apparatus, comprising:
container means for enclosing a portion of the ophthalmic instrument;
a base;
movable support means for pivotally moving said container means relative to said base;
braking means for selectively permitting pivotal movement of said fixed support means relative to said movable support means, having alternatively disposed first and second series of plates, a solenoid with a movable core, a Vee-shaped member attached to the core with the sides of the member extending over the alternatively disposed first and second series of plates, and a clamp member attached

to the outermost series of plates and between the sides of the Vee-shaped member; and



control means for activating and inactivating the solenoid to permit arcuate movement of said container means.

4,053,214

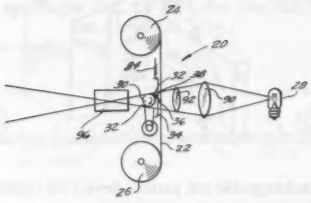
ADVANCE MECHANISM

John N. Brucat, Floral Park, N.Y., assignor to Instructional Communications Technology, Inc., Lloyd Harbor, N.Y.

Filed Mar. 5, 1976, Ser. No. 664,145

Int. Cl.[2] G03B *1/22*

U.S. Cl. 352—191 **23 Claims**



1. An advance mechanism for perforated materials for advancing the material thourgh a path of light comprising:

a support structure adapted to be in line with a source of light so that light passes through an aperture in the support;

material support and advance means for directing the perforated material along the pathway into and out of alignment with the aperture;

a pawl mechanism including spring means on the support adjacent the aperture and normally positioned in a normal retracted position in alignment with a slot adjacent to the aperture in the support;

drive means for cooperating with the material advance means and for biasing the spring and directing the pawl mechanism through the slot into engagement with a perforation in the material and then along the slot a predetermined distance to advance the material and then releasing the pawl mechanism permitting this spring to return the pawl to the retracted position out of the slot;

return means responsive to release of the pawl mechanism and retraction of the pawl through the slot to return the pawl to normal retracted position;

limit means positioned on the support and on the pawl mechanism to restrict the distance of movement of the pawl mechanism along the length of the slot;

the limit means including at least one enlarged receiving surface on the support and a corresponding enlarged bearing surface on the pawl mechanism whereby movement of the pawl mechanism along the slot a predetermined distance will bring the enlarged bearing surface into engagement and stop further movement of the advance mechanism with respect to the slot and with the engagement between the enlarged surfaces distributing the force applied in limiting the movement of the pawl mechanism;

the pawl mechanism including an elongated leaf spring mounted on the support and having a downwardly extending pawl intermediate its ends in alignment with and in position for extension through the slot in the support;

a drive projection extending from the side of the elongated leaf spring opposite to the pawl and in position for engagement by a portion of the drive means;

the elongated leaf spring being slidably positioned on the support so that engagement of the drive means with the drive projection and application of a force thereto will bias the leaf spring until the pawl extends through the slot into engagement with a perforation in the perforated material and then the leaf spring will be slidably moved by the drive means and the perforated material accordingly advanced, and when the drive means is disengaged from the leaf spring, the leaf spring will return to its initial configuration with the pawl disengaged from the perforated material and withdrawn through the slot in the support whereupon the return means can return the leaf spring to the normal retracted position; and

the drive projection being resilient and capable of acting as a spring independent of the remainder of the leaf spring to facilitate continued movement of the drive means after the movement of the advance mechanism has been stopped to permit disengagement therebetween and to cooperate in permitting the leaf spring to flex and disengage the pawl from the perforated material thereby preventing damage to the perforated material when the perforated material is manually pulled or when a perforation is not properly aligned with the pawl.

4,053,215

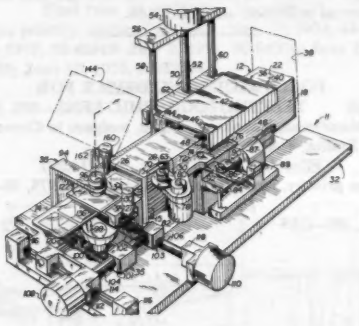
FILM STRIP HANDLING APPARATUS AND METHOD

James O. Haning, Palo Alto; Bram Kool, Saratoga; Jules G. Moritz, Los Altos Hills, and Robert Mizrahi, El Cerrito, all of Calif., assignors to Microform Data Systems, Inc., Mountain View, Calif.

Division of Ser. No. 536,510, Dec. 26, 1974, Pat. No. 3,963,336, which is a division of Ser. No. 313,902, Dec. 11, 1972, Pat. No. 3,909,122, which is a division of Ser. No. 101,224, Dec. 24, 1970, Pat. No. 3,743,400. This application Jan. 2, 1976, Ser. No. 646,133

Int. Cl.[2] G03B *23/04*; B65H *3/32*

U.S. Cl. 353—116 **12 Claims**



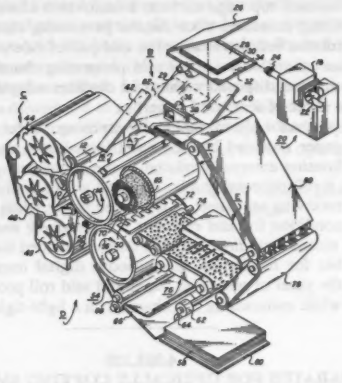
1. In information retrieval apparatus a support; means on the support for mounting an information-containing strip in an operative position for movement with respect thereto; a rotor; means mounting the rotor for frictional engagement with a side edge of the strip disposed in said operative position; and means coupled with the rotor for rotating the same in opposed directions to thereby move said strip relative to said support.

4,053,216

COLOR TRANSPARENCY REPRODUCING MACHINE

Louis D. Mailloux, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 540,617, Jan. 13, 1975. This application Aug. 6, 1976, Ser. No. 712,623
Int. Cl.[2] G03G *15/01*
U.S. Cl. 355—4 1 Claim



1. An electrophotographic printing machine for reproducing a color transparency, including:

a photoconductive member;

a means for charging at least a portion of said photoconductive member;

a platen;

means for projecting a light image of the transparency onto said platen;

a screen member disposed on said platen for modulating the light image of the transparency projected onto said platen to form a half-tone light image thereof;

means for filtering the half-tone light image to form a single color light image;

a composition frame disposed on said platen defining an opaque border extending outwardly from the color transparency image formed on said platen;

means for exposing the charged portion of said photoconductive member to a light image of said composition frame and the single color half-tone light image of the transparency to record on said photoconductive member a combined electrostatic latent image of the transparency and the electrostatic latent image of said composition frame:

means for developing the combined electrostatic latent image recorded on said photoconductive member with toner particles complementary in color to the color of the single color light image;

means for transferring the toner powder image adhering to the combined electrostatic latent image recorded on said photoconductive member to a sheet of support material, said transferring means comprising corona generating means disposed adjacent to said photoconductive member and adapted to apply an alternating charge potential to said photoconductive member pre-conditioning the toner particles thereon to readily facilitate the transfer therefrom, a transfer member operatively associated with said corona generating means and having the sheet of support material secured releasably thereto, means for electrically biasing said transfer member to a potential of sufficient magnitude and polarity to attract the pre-conditioned toner particles from the combined electrostatic latent image recorded on said photoconductive member to the sheet of support material secured thereto; and

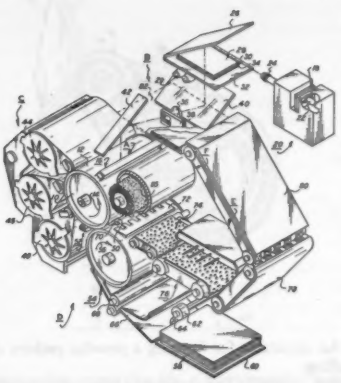
means for fusing the toner powder image to the sheet of support material.

4,053,217

COLOR TRANSPARENCY REPRODUCING MACHINE

Louis D. Mailloux, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 540,617, Jan. 13, 1975. This application Aug. 6, 1976, Ser. No. 712,431
Int. Cl.[2] G03G *15/01*
U.S. Cl. 355—4 1 Claim



1. An electrophotographic printing machine for reproducing a color transparency, including:

a platen;

means for projecting a light image of the color transparency onto said platen;

a screen member disposed on said platen for modulating the light image of the color transparency projected onto said platen to form a half-tone light image thereof;

a photoconductive member;

means for charging at least a portion of said photoconductive member;

means for filtering the half-tone light image;

a composition frame disposd on said platen defining an opaque border extending outwardly from the color transparency image formed on said platen;

means for exposing the charged portion of said photoconductive member to a light image of said composition frame and the filtered half-tone light image of the color transparency to record on said photoconductive member a combined electrostatic latent image of the color transparency and said composition frame;

means for developing the combined electrostatic latent image recorded on said photoconductive member with toner particles complementary in color to the color of the filtered half-tone light image;

means for transferring the toner powder image adhering to the combined electrostatic latent image recorded on said photoconductive member to a sheet of support material; and

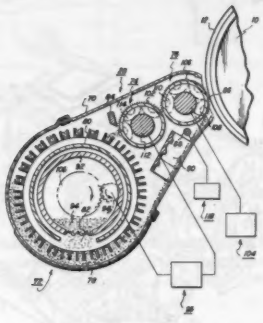
means for fusing the toner powder image to the sheet of support material, said fusing means comprising means for transporting the sheet of support material with the toner powder image deposited on one surface thereof along a path of movement, said transporting means being arranged to be in substantial contact with the other surface of the support material, means for heating said transporting means, and a radiant energy source arranged to be in thermal communication with a sheet of support material for supplying the energy output thereof onto the sheet of support material being moved with the toner powder image thereon by said transporting means along the path of movement for affixing substantially permanently the toner powder image to the sheet of support material.

4,053,218

DEVELOPMENT SYSTEM

Eugene A. Mikolas, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 10, 1975, Ser. No. 630,836
Int. Cl.² G03G 15/09
U.S. Cl. 355—15 **14 Claims**



1. An apparatus for forming a powder pattern on a surface, including:

means, operable for a variably selectable duration of time, for advancing particles;

means, in a particle receiving relationship with said advancing means, for applying particles to at least a portion of the surface, in response to said advancing means being operable, and for removing other extraneous particles from the surface, in response to said advancing means being inoperable, said applying means being a fixed distance from the surface; and

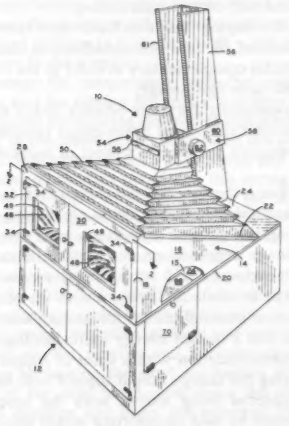
electromagnetic means operatively associated with said applying and removing means to remove particles therefrom, said electromagnetic means being operable in response to said advancing means being inoperable.

4,053,219

DEVICE FOR USE IN PHOTOGRAPHICALLY PRINTING ENLARGED COPIES OF COLOR IMAGES

William R. Damm, 563 Tiffany Drive, and Jerry S. Damm, 528 6th St., Apt. A, both of Hollister, Calif. 95023

Filed Apr. 8, 1976, Ser. No. 675,069
Int. Cl.² G03B 27/32
U.S. Cl. 355—27 **9 Claims**



9. In a color enlarging device for providing enlarged color images taken from negatives, slides and the like, the combination comprising:

A. a cabinet having defined therein a processing chamber normally maintained in a light-tight condition defined by means including a pair of upstanding side walls, each being characterized by a substantially horizontally oriented bottom edge surface, a front edge surface normally related to the bottom edge surface, and a downwardly inclined top edge surface, a removable closure panel defining an access door for the processing chamber, and a tubular bellows attached to said pair of side walls defining an extensible cover for said processing chamber;

B. an easel disposed within said chamber adapted to receive a sheet of sensitized paper;

C. means for photographically exposing a sheet of sensitized paper received by said easel including a movable lamp housing externally related to the chamber;

D. a roll processing tube disposed within said chamber for receiving said sheet of sensitized paper while a light-tight condition for said chamber is maintained; and

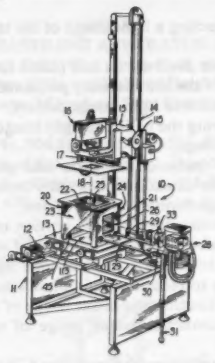
E. means including a flexible sleeve extended into the chamber for facilitating simultaneous digital manipulation of the sheet of sensitized paper and said roll processing tube while maintaining the chamber in a light-tight condition.

4,053,220

APPARATUS FOR OPTICALLY COPYING SMALL FILM IMAGES WITH GOOD RESOLUTION

Paschal S. Mathison, New Rochelle, N.Y., assignor to Photographic Equipment Service, Inc., New Rochelle, N.Y.

Filed Feb. 20, 1976, Ser. No. 660,035
Int. Cl.² G03B 13/28, 27/70
U.S. Cl. 355—45 **7 Claims**



1. Apparatus for optically copying to a desired scale with good resolution reproductions of small film images, comprising, in combination with

A. the equivalent of a filmstrip/slide or animation stand apparatus including a reproducing camera mounted upon an upright track support for elevational adjustment and having the axis of its focally adjustable lens and its gate arranged substantially downward, and a lateral tabletop supported below the camera lens for interception of the axis of the latter thereby, of

1. means defining an in-focus, image-displaying internal chamber including a lateral bottom wall structure and an entrance upright sidewall with a top portion of said means having a large opening down through which the axis of the reproducing camera lens extends to the top face of the bottom wall structure and with the entrance wall having a beam entrance window;

2. means providing the top face of said bottom wall structure with a screen surface upon which an image bearing beam may be projected for display thereon of an in-

focus image for photographic transfer upwardly into the reproducing camera;

3. means supporting a projector with the optical axis of its gate and projecting lens arranged substantially laterally and extending through the beam entrance window into said chamber; and

4. an oblique transparent mirror mounted in said chamber behind said entrance window and canted obliquely forward toward the latter so that its reflective surface is arranged at an acute angle to the bottom lateral screen surface with the beam entrance window located in this angle whereby said reflective surface receives image bearing beams from said projector and reflects them in focus downward to and upon said top face of the screen for reflection of the in-focus images back upward through said transparent mirror and the top opening for reception by said camera;

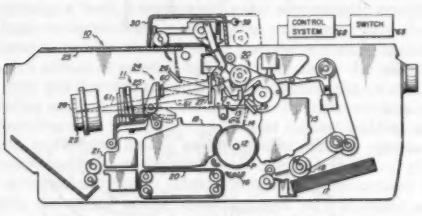
5. said transparent mirror being of good optical glass and of a thickness (≦) one-eighth of an inch.

4,053,221

MULTI-MODE REPRODUCING APPARATUS

Thomas Lynch, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 14, 1975, Ser. No. 621,898
Int. Cl.² G03G *15/28*; G03B *27/70*
U.S. Cl. 355—60 **15 Claims**



4. A multi-mode reproducing apparatus for copying documents selectively at one of a plurality of copy image magnifications comprising:

an imaging surface arranged for movement at a given velocity;

optical means for viewing said document and for projecting an image thereof onto said surface selectively at one of said plurality of copy image magnifications, said optical means including:

a first fixed lens which is not movable to change the projected image magnification, said first lens being arranged to project an image of said document onto said surface at a first projected image magnification; means for supporting said first lens in a stationary position;

a second movable lens and means for supporting said second lens for movement between a first stored position where it is inoperative and a second position where it is operative to project an image of said document onto said surface at a second projected image magnification different from said first magnification; and

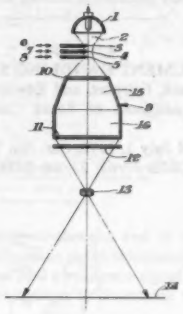
means for selectively employing either said first lens or said second lens, but not both in combination for viewing said document.

4,053,222

ILLUMINATING APPARATUS FOR PHOTOGRAPHIC COLOR ENLARGER

Mario Gandini, Brixen, Italy, assignor to Durst AG. Fabrik Fototechnischer Apparate Bozen, Bolzano-Bozen, Italy

Filed May 13, 1976, Ser. No. 685,975
Claims priority, application Italy, May 20, 1975, 4827/75
Int. Cl.² G03B *27/76*
U.S. Cl. 355—71 **7 Claims**



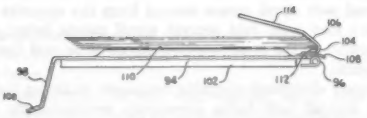
1. An illuminating apparatus for a photographic color enlarger comprising a color-mixing compartment having light-admitting and light-emerging surfaces, the color-mixing compartment having a first part disposed adjacent its light-admitting surface directly connected to a second part disposed adjacent its light-emerging surface, the first part having sides disposed at a substantial obtuse angle relative to the light-admitting surface in the form of a truncated pyramid, the second part having sides disposed substantially perpendicularly to the light-emerging surface substantially in the form of a parallelepiped head whereby a substantially uniform illumination of the light-emerging surface is obtained.

4,053,223

DOCUMENT PLATEN COVER FOR PHOTOCOPY MACHINE

Arthur W. Nebiker, Stamford, Conn., and Daniel N. Yanofsky, Jericho, N.Y., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Jan. 9, 1976, Ser. No. 647,889
Int. Cl.² G03B *27/62*
U.S. Cl. 355—75 **10 Claims**



1. A document cover for a copying machine having a platen on which documents are placed for copying, said cover comprising:

A. a relatively rigid body member adapted to overlie the platen of the copying machine and a document when the latter is placed on the platen for copying, said body member having a flat planar portion dimensioned at least to cover the platen of the copying machine and having an upper surface opposite a lower surface normally juxtaposed the copying machine platen,

B. means disposed along one edge of said flat portion of said body member for pivotally connecting said body member to the copying machine whereby said body member can be moved to a raised position in which the copying machine platen is exposed for placing or removing of documents,

C. means disposed adjacent the opposite edge of said body member of grasping said body member for movement thereof between the normal position overlying the platen and said raised position, and

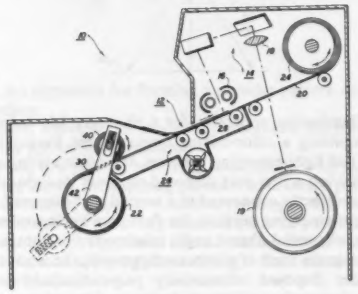
D. a relatively rigid retaining means on said body member adjacent said one edge of said body member against which retaining means the documents bear and by which retaining means the documents are supported and retained in position on said upper surface of said body member of easy removal of successive documents by an operator when said body member is moved to its raised position.

4,053,224

DOCUMENT HANDLING SYSTEM

Charles M. Burkard, Fairport, and Edward C. Bock, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed July 1, 1976, Ser. No. 701,701
Int. Cl.² G03B *27/62, 27/64;* B65H *5/02, 5/04*
U.S. Cl. 355—76 **5 Claims**



1. In an automatic handling system of a copying apparatus for making pre-collated copy sheet sets by repeated collated imaging of a set of original document sheets, the improvement comprising:

an elongated windable document holding first web with a document side thereof being adapted for supporting said imaging documents thereon;

first web scroll means wound from one end of said first web and inside wound from said document side for winding up a set of otherwise unattached documents on only said first web into said first scroll means and for retaining the documents between the turns of only said first web in said first scroll means;

second web scroll means wound from the opposite end of said first web, said second scroll means being outside wound, in the same winding direction as said first scroll means;

a second elongated windable document retaining web;

said second web being commonly interleavingly wound with said first web on only said second web scroll means from one end of said second web to retain documents in said second scroll means between turns of said first and second webs;

means for winding a third web scroll from the opposite end of said second web;

said first web having a minor intermediate unwound exposed segment extending between said first and second scroll means for the imaging of documents on said first web;

means for recirculatingly winding and unwinding said first web between said first web scroll means and second web scroll means to recirculatingly expose individual documents on said intermediate segment of said first web between said first and second web scroll means in a pre-collated order;

optical imaging means for imaging documents on said intermediate segment of said first web between said first and second web scroll means for copying of said documents in a pre-collated order;

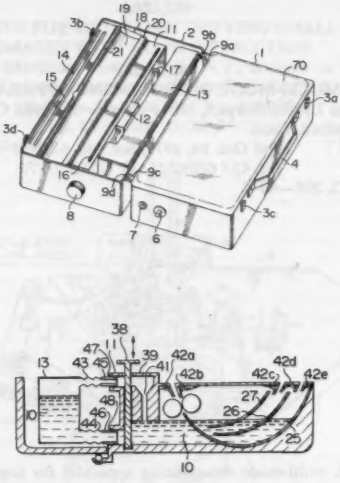
said second web normally merging with said document supporting side of said first web between said intermediate segment and said second scroll means, but separating from said first web before said intermediate segment so that documents are not imaged through said second web by said optical imaging means.

4,053,225

PORTABLE COPIER

Hisao Morohashi, Tokyo, Japan, assignor to Ohno Research & Development Laboratories Co., Yokohama, Japan

Filed Apr. 14, 1976, Ser. No. 676,799
Claims priority, application Japan, Apr. 17, 1975, 50-4667; June 12, 1975, 50-71247; Apr. 19, 1975, 50-53811
Int. Cl.² G03B *27/72*
U.S. Cl. 355—115 **20 Claims**



1. A portable copier, comprising:

a. a contact exposure unit including

i. a first housing part having at one face side thereof a light-pervious exposure contact surface, and

ii. exposure means disposed in said first housing part and having a light source for illuminating said exposure contact surface;

b. a liquid development unit including

i. a second housing part having an access face side, and

ii. liquid development means disposed within said second housing part and comprising a developing chamber and slot means located at said access face side to provide openings for inserting photosensitive and transfer papers into and withdrawing them from said developing chamber;

and

c. means for separably connecting said first and second housing parts to each other such that said first and second housing parts, when interconnected, locate said exposure contact surface in face to face relation with said slot means and coact to form a complete outer housing for the copier.

4,053,226

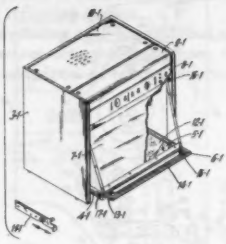
PHOTOGRAPHIC PRINTER

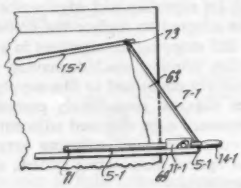
Maksymilian A. Michalski, Woodside, N.Y., and Ellis Ashkenazi, Ridgewood, N.J., assignors to Berkey Photo, Inc., Woodside, N.Y.

Continuation of Ser. No. 504,708, Sept. 10, 1974, abandoned. This application Mar. 8, 1976, Ser. No. 664,425

Int. Cl.[2] G01J *1/00*

U.S. Cl. 355—121 **16 Claims**





1. A printer for use in exposing photosensitive material comprising a base, a transparent plate substantially covering the base, means pivotally mounting the transparent plate above the base to receive photosensitive material and copy therebetween, a source of printing light mounted above the transparent plate and directed towards the transparent plate, a cabinet including said base and projecting upwardly from said base and surrounding said transparent plate, said cabinet holding said source, said cabinet having a panel at least partially opaque to rays closing the front of the cabinet above the transparent plate and movable therewith, guideway means on the cabinet for slidable movement of the viewing panel as it is raised and lowered with the transparent plate as the plate is swung upwardly and downwardly to provide space so as to insert or remove the photosensitive material and the copy from between the plate and the base, said guideway means including guide means for guiding the top of the viewing panel horizontally as the viewing panel is moved upwardly to cause the viewing panel to rest horizontally within the cabinet when it is lifted.

4,053,227

METHOD AND APPARATUS FOR AUTOMATIC AND CONTACTLESS MEASUREMENT OF THE HEIGHT OF MOVING BLADES OF A TURBINE

Viktor Bodlaj, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 3, 1975, Ser. No. 619,489

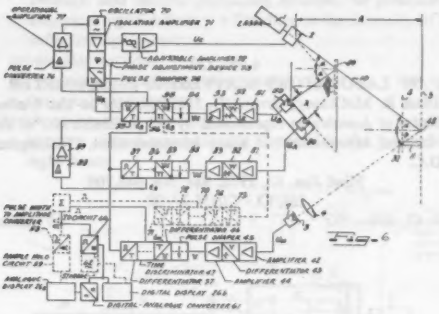
Claims priority, application Germany, Oct. 7, 1974, 2448219

The portion of the term of this patent subsequent to Dec. 2, 1992, has been disclaimed.

Int. Cl.[2] G01C *3/08*

U.S. Cl. 356—4 **8 Claims**

1. A method for automatic, contactless measurement of the height of individual blades on a rotating turbine rotor comprising rotating the turbine rotor having the blades arranged thereon, deflecting a laser beam from a given path at a known frequency of deflection to move the deflected beam across the path of the moving blade to have a portion of the beam reflected from an end of the blade, sensing the portion of the beam reflected from the end of the blade to create a reflected signal, sychronizing the speed of rotation of the rotor with the



frequency of deflection so that the end of the blade and deflected beam reach the same point simultaneously, and applying the reflected signal and a reference signal from the beam to an electronic analysis system to determine the height of the individual blade.

4,053,228

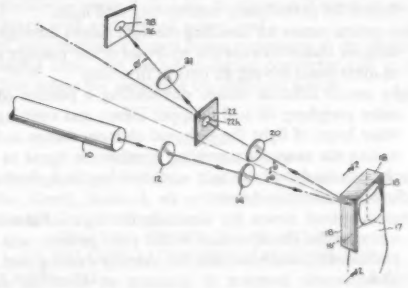
FINGER IDENTIFICATION

Michael Schiller, 4465 Douglas Ave., Riverdale, N.Y. 10471

Filed Dec. 12, 1975, Ser. No. 640,174

Int. Cl.[2] G06K *9/08*; G01B *11/24*; G06K *9/00*

U.S. Cl. 356—71 **22 Claims**



1. Identification apparatus comprising:

a source of spatially coherent light to provide an interrogating beam,

a plate transparent to said interrogating beam, said plate having first and second surfaces, said second surface being adapted to receive a fingerpress,

said beam being directed to said first surface of said plate,

said beam being partially reflected at said second surface of said plate when a fingerpress is applied at said second surface to provide a reflected light beam modulated with identification information,

said partial reflection having a first magnitude at an optical discontinuity between said plate and the finger crests applied thereto, said partial reflection having a second magnitude substantially different from said first magnitude at an optical discontinuity between said plate and air,

said beam being substantially orthogonal to the plane of said first and second surfaces to provide said reflected light beam with spatially undistorted identification information and optimized signal to d.c. ratio,

said reflected light beam containing spatial frequencies down to zero to provide finger geometry information and

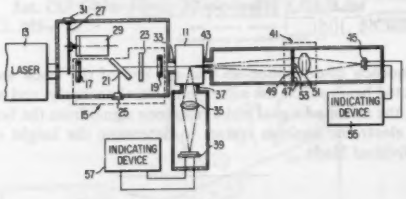
indentification means optically coupled to said reflected light beam.

4,053,229

2°/90° LABORATORY SCATTERING PHOTOMETER

William R. McCluney, Greenbelt, Md., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jan. 13, 1976, Ser. No. 648,700
Int. Cl.² G01N *21/00*
U.S. Cl. 356—103 13 Claims



1. A photometer for measuring the light scattered by particles in a hydrosol at substantially 2° and substantially 90° simultaneously, comprising:

a body having a passage for receiving the hydrosol;

a light source;

rotatable chopper means axially aligned with the light of said source for periodically interrupting said light;

first optical means for directing the light passed through said chopper means toward the hydrosol in the passage as an incident beam having an optical first axis;

light source detector means surrounding a portion of the outer periphery of said chopper means and emitting another beam of light through said chopper means and detecting the same for providing a reference signal to synchronously detect the light scattered by the hydrosol;

a first photoelectric detector;

second optical means for directing the light of the beam scattered by the hydrosol in the passage onto said first photoelectric detector and for thereby causing said first photoelectric detector to generate an electrical signal indicative of the amount of the scattered light;

said second optical means having an optical second axis defining an angle of substantially 90° relative to the first axis, said second optical means being spaced from the first axis;

a second photoelectric detector;

third optical means having a radiant energy mask with an aperture for directing light of the incident beam scattered by the hydrosol in the passage toward said second photoelectric detector, the axis of the portion of the incident beam linearly transmitted by the hydrosol in the passage and the rays of the incident beam scattered through the aperture of said radiant energy mask defining an angle of substantially 2°;

a light trap spaced from the point of intersection in the direction of the first axis away from said light source for absorbing the light of said source linearly transmitted by the hydrosol in the passage; and

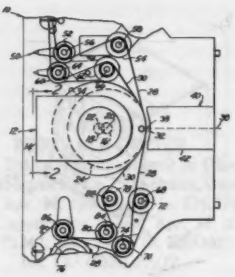
means in circuit with each of said photoelectric detectors for producing an indication of the amount of light directed towards said photoelectric detectors by the associated optical means respectively.

4,053,230

FULL-WIDTH FILM-SUPPORTING, DRIVING, AND STRIPPING ARRANGEMENT FOR MOTION PICTURE FILM PRINTING MACHINES

Ronald R. Balousek, Bloomfield Hills, Mich. 48013

Filed Sept. 13, 1976, Ser. No. 722,746
Int. Cl.² G03B *27/22*
U.S. Cl. 355—104 7 Claims



1. An improved film-width-supporting, driving, and stripping arrangement for superimposed edge-perforated negative and positive films adapted to replace the conventional film-edge-supporting and stripping arrangement in a conventional motion-picture film printing machine having power-driven mechanism operatively connected to film-supplying and film-receiving devices disposed respectively preceding and succeeding a film exposure zone disposed adjacent said conventional film-edge-supporting and stripping arrangement and illuminated by an optical illuminating system, said improved arrangement comprising

- an arrangement-carrying structure adapted to be mounted adjacent said film-exposure zone,
- a rotary film drive sprocket rotatably mounted on said structure and drivingly connected to said power driven mechanism and rotatable on a first axis of rotation with a portion of its periphery disposed substantially in said film-exposure zone and having film-driving teeth adapted to project into the edge perforations of the superimposed negative and positive film fed thereto from said film-supplying devices, - and a rotary film-supporting and stripping element of greater diameter than said drive sprocket rotatably mounted on said structure upon a second axis of rotation disposed in spaced parallel relationship to said first axis of rotation and having a periphery with a portion thereof disposed in said film-exposure zone adjacent to and in lateral alignment with said sprocket peripheral portion and having a width adapted to extend across said support substantially the entire width of said superimposed films exclusive of their respective perforations.

4,053,231

INTERFEROMETER MIRROR TILT CORRECTING SYSTEM

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Rudolf A. Schindler, Sierra Madre, Calif.

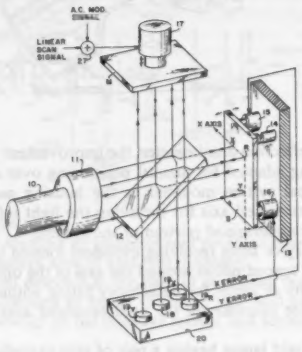
Filed Dec. 18, 1975, Ser. No. 641,803
Int. Cl.² G01B *9/02*
U.S. Cl. 356—106 S 7 Claims

1. In an interferometer having two optical paths from a monochromatic source to a data detector and actuating means for varying the length of one of said optical paths, a servo system for so automatically adjusting the angular tilt of a reflecting planar surface in one of said paths as to maintain parallel the interfering beams of said two paths at the optical output of said interferometer, said reflecting planar surface having three points R, X and Y spaced apart on mutually perpendicular X and Y axes, said point R being at the intersec-

tion of said axes, and said points X and Y being on respective X and Y axes, the combination comprising

three detectors near said optical output of said interferometer disposed on said X and Y axes as reflected to said optical output on a plane normal to the nominal beam axis at said optical output, one detector placed to receive light reflected from said point R of said reflecting surface, one of the other two detectors placed to receive light reflected from said point X of said reflecting surface and the third detector placed to receive light reflected from said point Y of said reflecting surface,

means for producing a 90° phase shifted signal e_r in response to light waves detected by said one detector from said point R, said signal e_r being proportional to the optical



path difference of light reflected from said point R, and separate means responsive to separate ones of said other two detectors for producing signals e_x and e_y proportional to the optical path differences of light reflected from said points X and Y,

means responsive to an X error signal for tilting said X axis in said reflecting surface through an angle proportional to the amplitude of said X error signal,

means responsive to a Y error signal for tilting said Y axis in said reflecting surface through an angle proportional to the amplitude of said Y error signal,

means for multiplying said signal e_x by said signal e_r to obtain said X error signal, an

means for multiplying sai signal e_y by said signal e_r to obtain said X error signal.

4,053,232

ROTATING-COMPENSATOR ELLIPSOMETER

Frederick H. Dill, South Salem, and Peter S. Hauge, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 373,540, June 25, 1973, Pat. No. 3,880,524. This application Apr. 28, 1975, Ser. No. 572,476

The portion of the term of this patent subsequent to Apr. 29, 1992, has been disclaimed.

Int. Cl.[2] G01J *4/02*; G02F *1/01*

U.S. Cl. 356—118 **5 Claims**

1. In an automatic ellipsometer for measuring characteristics of a sample and including:

a monochromatic light source for directing a light beam of a known wavelength onto said sample at a known angle of incidence so that the beam is reflected from the surface of the sample;

a first polarizing element in the path of incident light beam and adapted to be fixed at a predetermined angle relative to the plane of incidence of the beam;

adjusting means for setting the azimuth of said first polarizing element at different discrete predetermined angles relative to said plane of incidence;

a second polarizing element disposed in the path of the reflected light beam;

a photoresponsive device in the path of said reflected light beam and responsive to said beam, after it has passed through said second polarizing element, to produce an electrical signal which is a function of the intensity of the reflected light beam;

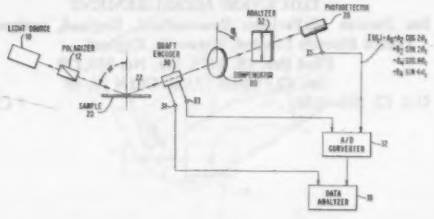
an angular encoder;

an analog-to-digital converter; and

a data analyzing means;

the improvement comprising:

a rotating optical compensator disposed in the path of the light beam;



said second polarizing element being fixed at a known angle relative to said plane of incidence;

said angular encoder being associated with said rotating compensator for providing outputs consisting of first pulses for each revolution of said rotating compensator and respective second pulses for each chosen fraction of each of the revolutions;

said analog-to-digital converter being responsive to the outputs of said angular encoder and to the signal from said photoresponsive device for digitizing said signal in accordance with said second pulses; and

said data analyzing means being responsive to the digitized signal from said analog-to-digital converter and to said first pulses for analyzing the digitized signal.

4,053,233

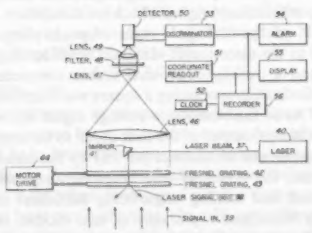
RETROREFLECTORS

Fritz Bien, Arlington; Morton Camac, Lexington, and Michael Elliot Gersh, Bedford, all of Mass., assignors to Aerodyne Research, Inc., Bedford, Mass.

Filed Mar. 15, 1976, Ser. No. 667,035

Int. Cl.[2] G01B *11/26*; G01D *21/04*; G02B *5/12*

U.S. Cl. 356—141 **2 Claims**



2. A method for detecting and locating a person on the surface of a body of water comprising:

positioning on said person an article of apparel having a plurality of retroreflectors mounted in an upper surface thereof and distributed angularly around said surface, said retroreflectors having front surfaces to receive a radiation signal and right angled rear reflective surfaces to reflect impinging radiation back at 180° angle from incoming radiation,

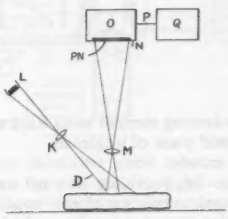
directing from an airplane radiation scanned across an area at a scan rate to cause at least three scan lines of radiation to pass across an area of the size of said retroreflectors,
receiving and detecting at said airplane radiation reflected from said retroreflectors, and
deriving a signal from said reflected radiation to denote the presence of said retroreflectors.

4,053,234

THICKNESS MEASUREMENT

Ian Duncan McFarlane, Beaconsfield, England, assignor to United Biscuits Limited, Isleworth, England

Filed Feb. 18, 1975, Ser. No. 550,170
Int. Cl.² G01B *11/00*; G01N *21/48*
U.S. Cl. 356—156 **7 Claims**



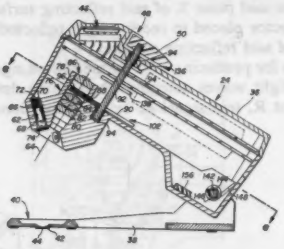
1. In an apparatus for use in measuring the position of a surface in a direction normal to said surface, as said position is related to a datum, wherein a beam of light is projected onto said surface along a first axis with the light reflecting from said surface along a second axis, said axes being in a common plane, the improvement comprising:
a photodiode strip comprising a plurality of photodiodes positioned sequentially along a line, said strip being positioned transverse to said second axis with said line in said plane, whereby a change in the position of said surface in said direction will cause said second axis to move along said line with the result of a change in which of the photodiodes are illuminated by the reflected light; and
means connected to said photodiode strip for determining which photodiodes are illuminated to a predetermined degree, said means being arranged to repetitively scan the strip in a given direction to determine the voltage output of each diode in sequence along said line to thereby create a composite voltage signal which is a composite, as related to time, of the voltage output of each photodiode, as related to the direction of scan said beam having a leading edge and a trailing edge, said means connected to said photodiode strip producing a square wave initiated by that part (TA) of the composite voltage signal corresponding to the voltage output of the first diode to be illuminated to said degree and terminated (at TS) by the termination of said scan, the width of said beam between said leading edge and said trailing edge being sufficient to simultaneously illuminate a plurality of said diodes, said means determining which of the diodes, with respect to the direction of scan, is the first to be illuminated to said predetermined degree thereby determining the position of the reflected beam along said line, said means producing a sensible indication of the position of the reflected beam along said line calibrated in terms of the dimension between the part of said one surface at which the axes converge and said datum, said sensible indication being related to the time difference between said signals TA and TS.

4,053,235

DIGITAL REFLECTION DENSITOMETER SYSTEM

Perry Dwaine Hampton, Dallas, and James R. Cox, Richardson, both of Tex., assignors to Cosar Corporation, Garland, Tex.

Filed Apr. 27, 1973, Ser. No. 355,024
Int. Cl.² G01J *3/50*; G01N *21/48*
U.S. Cl. 356—188 **1 Claim**



1. In a reflection densitometer, the improvement comprising:
a housing adapted for manual positioning over a surface;
an optical system mounted in the housing and having a predetermined axis for receiving the light reflected from the predetermined portion of the system;
a plurality of lamp receiving cylinders formed in said housing at spaced points around the axis of the optical system;
a plurality of lamps for detachably fitting within said cylinders for illuminating the predetermined area of the surface;
each of said lamps having a pair of pins extending from the rear thereof;
a lamp socket mounted in each of said cylinders and having conductive sockets connected to a source of power for receiving said pins of said lamps;
light sensitive means mounted within the housing on the axis of the optical system for receiving reflected light passing through the optical system and for generating an output in accordance with the intensity of the received light;
optical filter means for selective positioning within the optical system and in alignment with the axis thereof;
electronic circuitry means mounted within said housing for receiving the output of said light sensitive means for generating a digital output indicative of the output of the light sensitive means;
said electronic circuitry including an operational amplifier coupled across the output of said light sensitive means for producing an output voltage proportional to the output current produced by the light sensitive means;
a logarithmic amplifier connected to the output of the operational amplifier;
digital volt meter means connected to the output of the logarithmic amplifier; and
digital display means including light emitting diodes mounted in the housing for actuation by the output of the digital volt meter means to provide a digital visual readout on said housing indicative of the output of the light sensitive means.

4,053,236

ABSORBANCE MEASURING PHOTOMETER

John G. Atwood; Hamilton W. Marshall, Jr., and Charles F. de Mey, II, all of Redding, Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation of Ser. No. 499,617, Aug. 22, 1974, abandoned.
This application July 8, 1976, Ser. No. 703,520
Int. Cl.² G01J *3/50*
U.S. Cl. 356—189 **11 Claims**

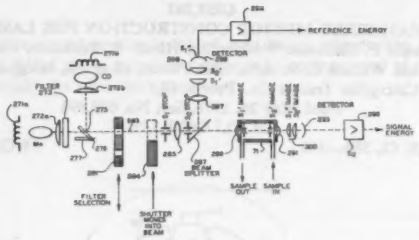
4. Apparatus for measuring the absorbance of a reaction mixture in a photometer sample cell comprising:
a. a light source emitting predetermined wavelengths; b.

means for forming the light from said source into a first beam;

c. means for defining the etendu of said first beam including a field stop and an aperture stop;

d. means for splitting said first beam into second and third contemporaneous beams while preserving the uniformity of illumination over both second and third beams and directing said second beam through said cell;

e. lens means to symmetrically image said field stop near the entrance of said cell and said aperture stop near the exit of said cell in such manner that, when passing through said cell, said second beam does not touch the sides thereof;



f. a first detector;

g. means forming an image of said aperture stop wholly on the sensitive area of said first detector;

h. a second detector in the path of said third beam;

i. means forming an image of one of said field and aperture stops wholly on the sensitive area of said second detector; and

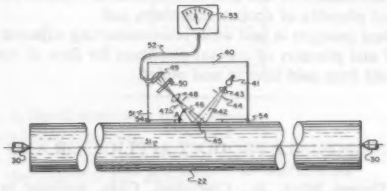
j. signal amplifying means including means to cause the signal from said second detector to cancel out any variations in the signal from said first detector resulting from light source fluctuations.

4,053,237

MEASURING THE SURFACE OF A ROLLER BY GLOSSMETER

Harry B. Casey, Covington, Va., assignor to Westvaco Corporation, New York, N.Y.

Filed July 2, 1976, Ser. No. 701,907
Int. Cl.² G01N *21/48*
U.S. Cl. 356—209 **3 Claims**



1. A method of testing the surface texture of a chill roll having a cylindrical surface of revolution about an axis for casting a film of thermoplastic material thereagainst, said method comprising the steps of:

obtaining co-relative spectral gloss data from the surfaces of representative chill rolls and respective plastic films cast thereagainst;

calibrating a gloss meter having incident and reflective optical axes converging in an optical plane at an illumination test area, said calibration corresponding to said corelative spectral gloss data;

positioning said glossmeter on the surface of a cylindrical test roll with said optical plane aligned to substantially parallel coincidence with the cylindrical axis of said roll;

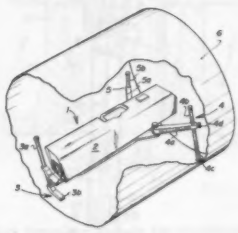
correlating the response measure of said glossmeter to said spectral data to determine the expected surface texture from plastic film that may be cast against said test roll.

4,053,238

SELF-LEVELING CONSTRUCTION ALIGNMENT LASER

Lyndell J. C. George, and Robert S. Shelly, both of Jacksonville, Ark., assignors to A G L Corporation, Jacksonville, Ark.

Filed Oct. 20, 1975, Ser. No. 624,238
Int. Cl.² G01C *9/18*
U.S. Cl. 356—249 **9 Claims**



3. A system for projecting and utilizing a light beam as a reference line for laying conduit comprising:

a light beam projecting device for projecting the reference beam of light,

a vertically adjustable leg attached to the front end of said projecting device for being positioned in the vertical plane passing through the axis of said beam of light so that said beam of light is centrally positioned within said conduit which said leg is positioned at the lowest point in the conduit,

horizontally pivotable side legs, one of said legs being attached to each side of said projecting device toward the rear of said device, said pivotable legs being vertically extendable so that said device may be centrally positioned in a conduit and leveled by the adjustment of said rear and front legs, whereby the reference beam of light coincides with a reference line within said conduit.

4,053,239

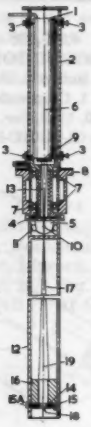
AXIS DEFINITION APPARATUS

Francis Richard Tolmon, Leatherhead, England, assignor to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain & Northern Ireland, London, England

Filed Nov. 4, 1975, Ser. No. 628,780
Claims priority, application United Kingdom, Nov. 5, 1974, 47777/74; May 19, 1975, 21314/75
Int. Cl.² G01C *9/14*
U.S. Cl. 356—250 **16 Claims**

1. Axis definition apparatus including a laser operable to produce an output beam, focussing means for defining a point source of light from the said output beam, an optical image forming device having an optical center and being adapted to operate on light when diverging from the said point source to produce at least one real image, the said optical image forming device and point source of light defining an optical axis in terms of a line through the said optical center and point source of light, an axis control member to control the positions of the said optical center and point source of light and thereby that of the optical axis, the axis control member being freely suspended from a rotatably mounted relatively fixed member to pivot about a pivotal point whereby rotation of the relatively fixed member produces a corresponding rotation of the axis control member about a vertical axis, the said corresponding rotation producing motion of the optical axis to sweep out a

conical surface characterised by a semi-angle, and means for adjusting the relative positions of the optical image forming



device and the point source of light to reduce the said semi-angle to zero.

4,053,240

OBJECT DISTANCE MEASURING SYSTEM FOR AN OPTICAL INSTRUMENT

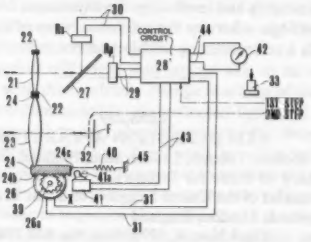
Hiroshi Aizawa; Kazuya Hosoe, both of Machida; Seiichi Matsumoto, Yokohama, and Hideo Yokota, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 18, 1974, Ser. No. 515,927

Claims priority, application Japan, Oct. 26, 1973, 48-120555

Int. Cl.[2] G01C *3/08*; G03B *13/20*

U.S. Cl. 356—4 **22 Claims**



1. An object distance measuring system comprising:

A. an image forming optical system capable of forming an image of an object, the optical system having an optical axis and being arranged to be shiftable along the axis from a predetermined first position on the axis to a second position in which the image of the object is placed on a destined image forming plane;

B. driving means for driving said optical system from said first position toward said second position, the driving means being operatively connected to said optical system;

C. detecting means for detecting the positional variation of said optical system on the optical axis, said detecting means being responsive to the positional variation of the optical system and producing a signal for stopping the optical system when the optical system reaches the second position, said driving means being electrically connected to said detecting means and stopping the shifting of said optical system in response to said signal produced by said detecting means;

D. converting means for converting a shifting distance of said optical system in moving from the first position to the second position, into a digital signal, the converting means producing a digital signal corresponding to the shifting distance of the optical system from the first position in relation to the shifting of the optical system; and

E. displaying means for digitally displaying the object distance said displaying means responsive to the digital output signal of said converting means to digitally display said object distance based on the digital signal which is produced by the converting means and which corresponds to the shifting distance of the optical system.

4,053,241

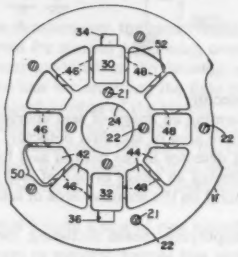
CHAMBERED MIRROR CONSTRUCTION FOR LASERS

Gerald P. Simmons, Washington; Hiram A. Brubaker, Peoria, and William E. Streight, East Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 24, 1976, Ser. No. 689,691

Int. Cl.[2] G02B *5/08*

U.S. Cl. 350—310 **8 Claims**



1. In a fluid cooled mirror assembly,

a generally circular mirror having a reflective surface and a centrally disposed opening therethrough,

a plurality of coolant chambers beneath said reflective surface of said mirror, said coolant chambers being serially arranged in two generally semicircular arcs from a first one to a last one of said plurality of coolant chambers,

an inlet in said mirror for admitting coolant fluid to said first one of said plurality of coolant chambers,

an outlet in said mirror for allowing removal of coolant fluid from said last one of said plurality of coolant chambers, walls formed in said mirror intermediate adjacent ones of said plurality of coolant chambers, and

coolant passages in said walls interconnecting adjacent ones of said plurality of coolant chambers for flow of coolant fluid from said inlet to said outlet.

4,053,242

DISPOSABLE PRODUCT APPLICATOR AND DISPENSING PACKAGE THEREFOR

John George Mast, Jr., Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

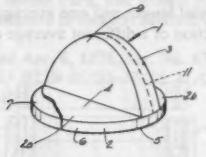
Filed Mar. 18, 1976, Ser. No. 668,253

Int. Cl.[2] A46B *5/02*

U.S. Cl. 401—6 **13 Claims**

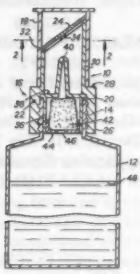
1. A hand-held, T-shaped disposable product applicator comprising a resilient, integral, one-piece structure having an applicator pad portion and an upstanding finger grip portion, said pad portion being normally substantially planar with a top surface and a bottom product-applying surface, said upstanding finger grip portion being normally substantially planar with opposite sides providing finger grip surfaces, said finger grip portion being normally substantially normal to and extending transversely across said top surface of said pad portion bisecting said pad portion into two substantially equal parts, said pad portion being foldable along its juncture with said finger grip portion with said bottom product applying surface folded upon

itself, said finger grip portion being of a thickness substantially twice the thickness of said pad portion whereby when said



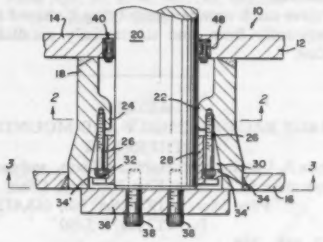
applicator pad portion is folded, said finger grip portion and said folded pad portion are substantially coplanar and of substantially the same thickness.

4,053,243
LIQUID APPLICATOR
David Levin, 10, Hope Road, Mountainview, Johannesburg, South Africa
Filed Dec. 1, 1975, Ser. No. 636,418
Claims priority, application South Africa, July 24, 1975, 75/4767
Int. Cl.[2] B43M *11/06*; B43K *5/00*
U.S. Cl. 401—186 **9 Claims**



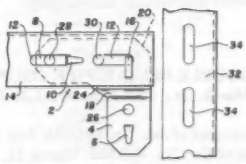
1. A liquid applicator comprising:
a. a liquid reservoir,
b. flow restrictor means having an inlet communicating with the reservoir and an outlet,
c. said flow restrictor means being effective to receive liquid from the liquid reservoir through said inlet, produce foam and direct said foam through said outlet,
d. a foam flow passage means extending outwardly from the flow restrictor means and having an open outer end, and
e. wear resisting cover means disposed over the outer end of the foam flow passage means and being porous to the flow of foam therethrough,
f. said foam flow passage means comprising a hollow elongated outlet support member extending between the flow resistor means and the cover means to form a foam chamber in which the passage of liquid foam is guided from the outlet of the flow restrictor means to the cover means,
g. said flow restrictor means including a restrictor material effective to permit liquid in foam form to pass therethrough.

4,053,244
COMPRESSION COUPLING MEANS FOR A RAISE BORING HEAD
Charles R. Dively, Seattle, Wash., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.
Filed Oct. 6, 1975, Ser. No. 619,658
Int. Cl.[2] F16B *2/14*; F16D *1/08*
U.S. Cl. 403—13 **8 Claims**



1. Compression coupling means for replaceably coupling a raise borer drive stem to a raise borer cutterhead, comprising:
a plurality of first means for mutually and interpositionally engaging both a cutterhead element, and a drive stem element therefor, for effecting locking or clamping contact pressure therebetween at a plurality of locations spaced-apart lengthwise of a drive stem element; and
second means for replaceably fastening one of said first means to at least one of said elements; wherein
said one first means comprises a plurality of wedge sectors for effecting an interference fit between a cutterhead element and a drive stem element therefor; and
said sectors are cooperative together to define a complete annulus for enveloping a portion of a drive stem element;
each of said sectors defines a quadrant of said annulus;
said sectors each having a first arcuate inner surface and a second arcuate outer surface for engaging a drive stem and a cutterhead, respectively;
one of said inner and outer surfaces has a plurality of grooves formed therein to receive fasteners; and
each of said grooves is interrupted by a channel formed in said one surface transverse of said grooves.

4,053,245
CONNECTOR
Peter Damian Wright, 137 West 2nd Ave., Vancouver, B.C., Canada (V5Y 1B8)
Filed May 3, 1976, Ser. No. 682,231
Int. Cl.[2] F16B *1/00*
U.S. Cl. 403—188 **9 Claims**



1. A connector for use in connecting two perforate members at a predetermined angle, the connector comprising;
a base plate;
a first catch member on the base plate able to engage in a perforation in one of the perforate members;
a second catch member on the base plate able to engage with a perforation in the second perforate member when the

two members are placed together at the predetermined angle;

a third catch member on the base plate able to engage a perforation in each perforate member that is spaced from a perforation engaged by the first and second catch members;

an offset formed in the base plate between either the first or the second catch member and the third catch member, the offset being about equal to the thickness of one perforate member;

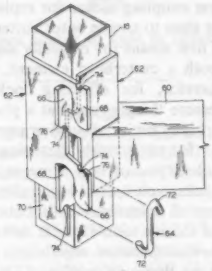
the three catch members each being L-shaped and extending outwardly from, and substantially parallel to the base plate.

4,053,246

STORAGE RACK ASSEMBLY AND MOUNTING CLAMP THEREFOR

Salvatore A. Uccello, East Hartford, Conn., assignor to Lok-Rak Corporation of America, East Hartford, Conn.

Filed Mar. 3, 1976, Ser. No. 663,452
Int. Cl.² A47F 5/00
U.S. Cl. 403—233 **2 Claims**



1. In a mounting clamp assembly for detachably securing horizontal members to posts, the combination comprising a post having a polygonal cross section, a sleeve having an internal cross section complementary to said cross section of said post and detachably secured to said post in tightly fitting engagement therewith, a horizontal member secured to said sleeve, a projection on said post below said sleeve preventing downward displacement of said sleeve, and a plurality of resiliently deformable S-configured clamping members, said sleeve comprising a pair of interfitting sections each having two horizontal and two vertical edges, a generally L-shaped finger along each of said vertical edges and a recess along the base portion of said fingers, said fingers on said sections being oppositely disposed and interfitting, said clamping members each having hook portions adjacent the ends thereof offset in different planes with one of said hook portions being seated in the recess of one interfitting finger and the other of said hook portions being seated in the recess of the other interfitting finger to prevent inadvertent disassembly.

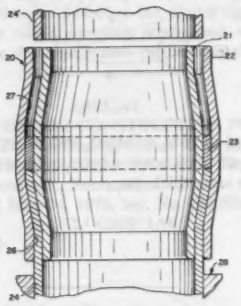
4,053,247

DOUBLE SLEEVE PIPE COUPLER

Richard O. Marsh, Jr., 1101 Standard Life Bldg., Pittsburgh, Pa. 15219

Continuation-in-part of Ser. No. 598,624, July 24, 1975, which is a continuation of Ser. No. 453,501, March 21, 1974, abandoned. This application Aug. 2, 1976, Ser. No. 710,571
Int. Cl.² B25G 3/28
U.S. Cl. 403—279 **22 Claims**

1. A metal coupler for joining two sections of coaxially juxtaposed plain end metal pipe and pipe pile, comprising an inner sleeve element of circular form, an outer sleeve element of circular form concentrically surrounding said inner sleeve element, and a centrally disposed annular member which connects and supports said sleeve elements in uniformly spaced radial relation along the length thereof, the space between said sleeve elements providing annular sockets on opposite sides of said annular member into which the ends of pipe and pipe pile will fit snugly, each of said annular sockets having an outer section of substantial length and one average diameter and an inner terminal section of a different average diameter adjacent



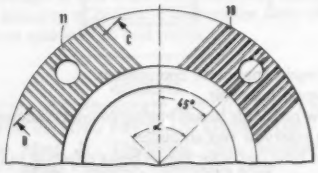
said annular member and an intervening conical section, the inner terminal section of each of said sockets having a length such that a line through the intersection of the conical section with the inner terminal section at the inner diameter thereof and the outer diameter of the inner terminal section at the inner terminus thereof, when projected, forms an angle with the longitudinal axis of the coupler less than 45°.

4,053,248

COUPLING FLANGE FOR A TORQUE TRANSMITTING SHAFT

Josef Schultenkamper, Essen; Bernd Eckert, Bruchkoebel, and Siegfried Schumann, Essen, all of Germany, assignors to Gelenkwellenbau GmbH, Essen, Germany

Filed Dec. 3, 1976, Ser. No. 747,226
Claims priority, application Germany, Dec. 4, 1975, 2554574
Int. Cl.² F16D 1/00
U.S. Cl. 403—337 **6 Claims**



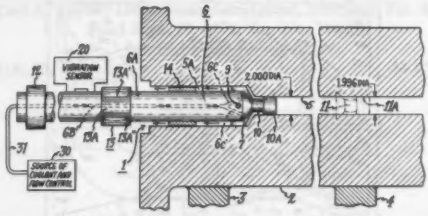
1. A flange, particularly on a torque transmitting shaft or the like, for rigidly but detachably coupling to a counter-flange and comprising a coupling plate having a coupling surface engagable face-to-face with a counter-coupling flange and there being a plurality of openings through said coupling plate to receive detachable fastener elements, said coupling surface having two tooth systems thereon each comprising a plurality of substantially parallel axially projecting teeth having inclined flanks, at least one tooth in each tooth system having one of a different height, spacing and shape from the other teeth in said system and said tooth systems are engagable with a complementary configuration on a counter-flange to connect nonrotatably the flanges.

4,053,249

APPARATUS AND METHOD FOR PRECISION OVERBORING AN ARCUATE, VARIABLE DIAMETER BORE

Phillip D. Ness, Bethel Park, and Robert A. Long, Pittsburgh, both of Pa., assignors to General Electric Company, Fairfield, Conn.

Filed Apr. 6, 1976, Ser. No. 674,118
Int. Cl.[2] B23B 35/00, 27/10, 51/00, 13/00
U.S. Cl. 408—1 BD 10 Claims



6. A method for precision overboring a variable diameter existing bore along the longitudinal center axis of a metal shaft supported in a position wherein the shaft sags along the longitudinal axis of said existing bore, comprising the steps of:

a. providing a rotary boring tool having a drive shaft at least as long as said existing bore and having a coolant passageway extending through the length thereof, and providing drive means operatively connected to said tool for driving it through said existing bore,

b. providing a source of liquid coolant and flow control means for selectively forcing coolant through said passageway,

c. mounting a double-bladed spade bit in operative position on the boring end of said tool, said bit having a fixed cutting diameter substantially larger than said existing bore diameter,

d. providing a plurality of boring tool pilots each having a different diameter, precision-formed, cylindrical guide surfce that matches within a predetermined tolerance one of the respective diameters of said existing bore, and mounting on said tool ahead of the bit one of said pilots matched to within said predetermined tolerance of the diameter of said existing bore at one end thereof,

e. operating said drive means to drive the pilot through said one end of the existing bore and to cause the bit to cut an overbore the longitudinal axis of which is caused by said pilot to match the longitudinal axis of the existing bore within said predetermined tolerance,

f. operating said flow control means to cool said bit and to rapidly flush metal chips out of the overbore,

g. monitoring the vibration of said rotary tool as the bit is driven through the shaft, thereby to detect a degree of vibration indicative of said predetermined tolerance being exceeded, and responsive to an indication of such excessive vibration changing the pilot initially mounted on said tool for another pilot having a guiding surface diameter within said predetermined tolerance of the portion of said existing bore then closest to the bit,

h. continuing the overboring by repeating steps (e) and (f) and then repeating step (g) to successively substitute different diameter pilots as indicated by the detection of excessive tool vibration until the overbore is completed,

i. providing a plurality of generally cylindrical follower bearings each having a plurality of coolant exhaust passages extending longitudinally therethrough, and each having a maximum outer diameter that matches the maximum cutting diameter of said bit within said pedetermind tolerance, and

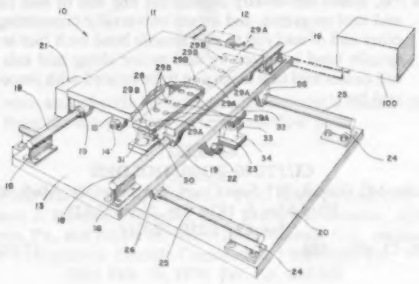
j. mounting said follower bearings at spaced points on said drive shaft prior to the movement of said spaced points into the overbore as the operations of step (h) are continued.

4,053,250

LINEAR INDEXER

James E. Jestice, Middletown, and Robert G. Weatherby, Northfield, both of Ohio, assignors to Weatherby & Associates, Inc., Middletown, Ohio

Filed Apr. 30, 1976, Ser. No. 682,151
Int. Cl.[2] B23B 39/08
U.S. Cl. 408—3 24 Claims



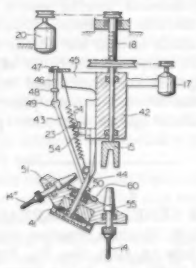
1. Apparatus for indexing a worktable carrying a workpiece upon which work operations are to be performed comprising, drive means to translate the worktable, program means movable with the worktable and dictating predetermined locations at which the worktable will stop for operations on the workpiece, lock means cooperatively interacting with said program means to hold the worktable at the predetermined locations, and control means directed by said program means to intermittently operate said drive means to position the worktable at the predetermined locations.

4,053,251

DRILLING MACHINE WITH AUTOMATIC TOOL CHANGER

Hiromichi Shichida, 984-121, Misawa, Hino, Tokyo; Hideo Katsube, 2-2-2, Myojin-cho, Hachioji, Tokyo; Kenichi Toyoda, 3-27, Tamadaira, Hino, Tokyo, and Mitsuo Saito, 2-2-15, Seijo, Setagaya, Tokyo, all of Japan

Filed Apr. 13, 1976, Ser. No. 676,563
Claims priority, application Japan, Apr. 25, 1975, 50-49748
Int. Cl.[2] B23B 39/20
U.S. Cl. 408—35 7 Claims



1. A machine provided with an automatic tool changer, comprising:

a motor,

a spindle head, means operatively connecting said motor and said spindle head to move said spindle head along an axis,

a spindle rotatably held by said spindle head,

a bar having one end thereof slidably supported by said spindle head,

a tool magazine rotatably supported by the other end of said bar,

a plurality of tool arbors rotatably held by said tool magazine and arranged such that as said tool magazine is rotated said tool arbors are sequentially aligned with said axis of movement of said spindle head, and means adapting said tool arbors to be engaged by said spindle to rotate said tool arbors and to be disengaged from said spindle,

spring means urging said bar and said tool magazine attached thereto to a position wherein said tool arbors engage said spindle in driving relationship,

a rod, means universally connecting one end of said rod to said tool magazine, and means universally connecting the other end of said rod to said spindle head such that as said spindle head is driven by said motor along said axis said rod causes said tool magazine to be rotated with respect to said bar.

4,053,252

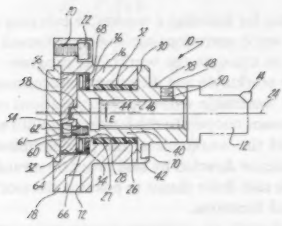
CUTTING TOOL HOLDER

Richard C. Gersch, 617 June Court, Traverse City, Mich. 49684

Filed May 5, 1976, Ser. No. 683,422

Int. Cl.² B23B *29/034*

U.S. Cl. 408—150 **17 Claims**



7. A cutting tool holder, comprising:

a hub member having a mounting end and an outwardly extending end and adapted to be rotated around its axis of rotation, said hub member having a cylindrical bore formed therein eccentric to said axis of rotation;

a bar holder having a cylindrical shank portion disposed in said hub bore and adapted to support a cutting bar having a cutting edge;

means for securing said bar holder in said bore while permitting rotation of said bar holder in said bore whereby rotation of said bar holder in said bore alters the radial distance of the cutting edge of said cutting bar from said axis of rotation, and

a tubular and cylindrical bearing sleeve constructed of a compressible material disposed between said eccentric bore and the shank of said bar holder whereby substantially the entire outer periphery of said bearing sleeve flatly abuts against the eccentrical bore and whereby substantially the entire inner periphery of said bearing sleeve flatly abuts against the outer periphery of said shank.

4,053,253

POWER GENERATING APPARATUS

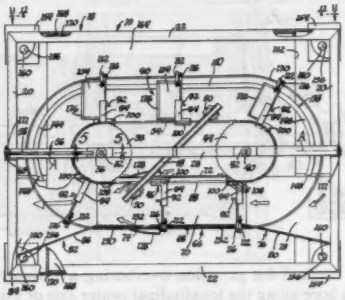
Carl E. Coffer, 140 W. Hopkins, Pontiac, Mich. 48055

Filed July 14, 1975, Ser. No. 595,584

Int. Cl.² F03B *9/00, 13/00*; F01D *23/00*

U.S. Cl. 415—5 **15 Claims**

1. Power generating apparatus, comprising body means adapted to be anchored against downstream or lateral movement in a generally horizontally flowing water stream, said body having a centerline to be aligned generally parallel with the direction of water flow, spaced vertical rotatable shafts mounted on said body approximately on said centerline, said body being formed to provide directing means generally parallel to but horizontally disposed entirely on one side of said centerline for directing water flow through said body, movable means driven by the water flow through said body and including single endless driven and drive means mounted to move in a generally horizontal plane about said shafts, said movable single endless means being arranged so that a portion



thereof moves adjacent said water flow directing means and the opposite portion thereof is disposed on the side of said centerline opposite said flow directing means, said movable means further including a plurality of supported paddle assemblies extending horizontally outwardly beyond said endless means and means for changing said paddle positions from a vertical position in said directing means to a substantially horizontal position beyond said directing means.

4,053,254

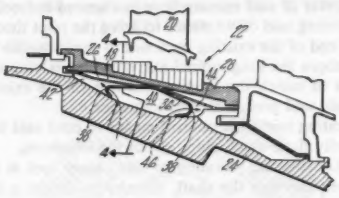
TURBINE CASE COOLING SYSTEM

Gary Francis Chaplin, Vernon, and Frederick Michael Schwarz, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Mar. 26, 1976, Ser. No. 670,916

Int. Cl.² F01D *11/08, 25/14*

U.S. Cl. 415—116 **7 Claims**



1. For a gas turbine engine, a turbine stator assembly comprising:

a turbine case having a plurality of cooling air ports circumferentially spaced about the outer periphery thereof;

a first row of stator vanes extending inwardly from the case upstream of the cooling air ports;

a second row of stator vanes extending inwardly from the case downstream of the cooling air ports;

an outer air seal which is positioned between said first and second rows of stator vanes and which radially opposes the blades of the engine rotor assembly, said outer air seal and said turbine case cooperatively forming an annular chamber therebetween which is in gas communication with the cooling air ports;

a manifold which is disposed within the annular chamber forming a cooling air distribution conduit for flowing cooling air from said ports circumferentially about the

engine, wherein said manifold has a multiplicity of cooling holes through which cooling air is uniformly flowable during operation of the engine; and

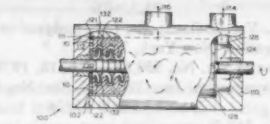
a cylindrical element which is attached to said manifold and spans the annular chamber to position the manifold axially within the chamber.

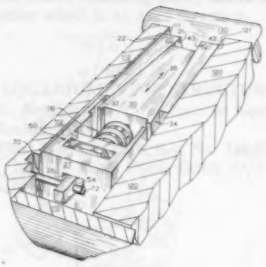
4,053,255

SELF-ADJUSTING SPACER FOR CENTRIFUGAL PUMPS

Carl A. Taylor, 1503 Glastonberry Road, Maitland, Fla. 32751

Filed Sept. 17, 1976, Ser. No. 724,398
Int. Cl.² F03B *11/02, 11/04*
U.S. Cl. 415—127 **14 Claims**





1. A self-adjusting spacer for use in a centrifugal pump of the type having a volute movable axially within a barrel and covered by an end barrel cover, said self-adjusting spacer comprising in combination:

a first sliding plate having an outer surface coupled with an inside surface of the barrel cover, with said first sliding plate having a first inclined surface thereon;

a second sliding plate having an outer surface coupled with an inner surface of the volute, with said second sliding plate further having a second inclined surface thereon generally parallel to and in sliding communication with said first inclined surface of said first sliding plate; and

bias means coupled between said first and second sliding plates for advancing the sliding communication therebetween in a preferred direction for increasing the separation between said outer surfaces of said first and second sliding plates, whereby any increase in the separation between the volute and the barrel cover will be absorbed by the effective combined width between said outer surfaces of said first and second sliding plates.

4,053,256

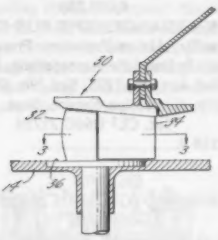
VARIABLE CAMBER VANE FOR A GAS TURBINE ENGINE

John Edward Hertel, East Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Sept. 29, 1975, Ser. No. 617,921
Int. Cl.² F01D *9/02, 9/00*
U.S. Cl. 415—161 **5 Claims**

1. Apparatus for directing the medium gas within the flow path of a gas turbine engine to a preferred angle within the flow path, comprising:

a variable camber vane having a leading edge element which is rotatably cantilevered from the outer wall of the flow path and a trailing edge element which is rotatably fixed relative to the outer wall at a point downstream of the leading edge element, wherein said leading and trailing edge elements are cooperatively disposed to form the



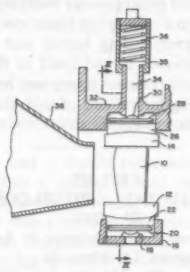
vane and wherein the trailing edge element is cantilevered from the inner wall of the medium flow path.

4,053,257

STATOR VANE ASSEMBLY FOR GAS TURBINES

Thomas J. Rahaim, Claymont, Del.; Richard J. Schaller, Allentown, Pa., and Elbert H. Wiley, Jr., Wenonah, N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 20, 1976, Ser. No. 659,869
Int. Cl.² F04D *29/02*
U.S. Cl. 415—214 **1 Claim**



1. An improved turbine stator vane assembly having ceramic components comprising a vane member disposed between, and in compressive intimate contact with, opposed end caps, wherein the inner surface of each of said end caps contains a groove for receipt of the respective end of the vane member providing pivot and seat interengaging surfaces, each of said grooves defining a compound arcuate surface having a major radius of curvature in a plane substantially parallel to the plane of the longitudinal direction of the vane and a minor radius of curvature in a plane perpendicular to the plane of the major radius wherein the improvement comprises:

said vane member defining an airfoil portion terminating at radially opposed ends in integral tenon portions having an outer surface conforming to the arcuate configuration of said groove for intimate substantially coextensive contact therebetween; and,

wherein the inner surface of said tenon portion is generally flush with the inner surface of said end cap when in the assembled position;

whereby, the tenon portion of the vane member fills the groove in the end cap providing a continuous smooth surface for non-turbulent fluid flow thereacross and wherein the configuration of the tenon further provides a cross-sectional area in the tenon relating to the immediately adjacent thickness of the airfoil portion such that the largest cross-sectional area of the tenon is adjacent the thickest portion of the airfoil portion for general equal rates of heating and cooling of said adjacent portions to

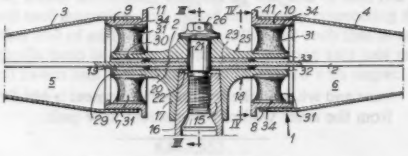
minimize thermal gradients with attendant thermal stresses at their juncture.

4,053,258

TAIL-ROTOR ARRANGEMENT FOR ROTOR CRAFTS

Rene Louis Mouille, Aix-en-Provence, France, assignor to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed Aug. 27, 1975, Ser. No. 608,215
Claims priority, application France, Sept. 19, 1974, 74.31664
Int. Cl.[2] B64C *27/38*
U.S. Cl. 416—134 A **10 Claims**



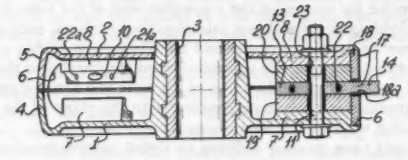
1. A two-bladed tail rotor arrangement for lightweight moderately priced gryoplanes or helicopters comprising a strip-like flexible spar having a uniform rectangular cross-section, said spar being held at its median portion in a boss secured to the rotor shaft formed by a pair of plates having laterally opposed ends, a shaped blade shell surrounding each half of the spar and connected to the latter solely in the area of its outer end and extending freely up to the corresponding lateral end of the plates, each blade shell progressively evolving in cross-section from its outer end into a cylindrical blade root forming a sleeve surrounding the corresponding lateral end of the plates, a cylindrical flange inserted in and fixed to the sleeve of said blade root and an elastic contact interposed between the flange and the corresponding lateral end of said plates thereby connecting said blade root to said boss.

4,053,259

AXIAL FAN ADJUSTABLE PITCH CONNECTABLE BLADES

Emilio Bianchi, Varese, Italy, assignor to Axial International Establishment, Mauren, Liechtenstein

Filed Oct. 28, 1975, Ser. No. 626,067
Claims priority, application Italy, Oct. 31, 1974, 29044/74; Oct. 14, 1975, 28250/75
Int. Cl.[2] F04D *29/36*
U.S. Cl. 416—208 **6 Claims**



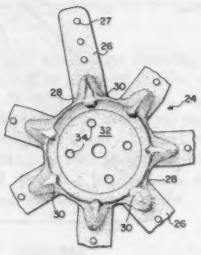
1. A fan comprising:
a. a first shell member having a first axis;
b. drive means for rotating said shell member about said axis;
c. a second shell member axially juxtaposed to said first shell member;
d. a plurality of circumferentially distributed ribs projecting from each shell member toward respective, opposite ribs on the other shell member,
1. each rib having a seating face of circularly arcuate cross section about a second axis transverse to said first axis;
e. a plurality of elongated blade members having each a root portion and a wing portion,
1. said root portion being of circularly arcuate cross section and interposed between two associated, opposite ribs,
2. said wing portion projecting radially outward relative to said first axis beyond said shell members; and
f. releasable clamping means axially clamping said shell members and said root portions to each other in a position in which each root portion is fixedly secured in conforming engagement between the seating faces of the associated ribs,
1. said clamping means including a plurality of clamping members, each clamping member axially passing through aligned respective openings in said shell members, two opposite ribs, and the associated root portion.

4,053,260

DOUBLE SPIDER STIFFENING ASSEMBLY FOR FAN BLADES

Clifford S. L. Yee, Indianapolis, Ind., assignor to Wallace Murray Corporation, New York, N.Y.

Continuation of Ser. No. 550,657, Feb. 18, 1975, abandoned.
This application June 18, 1976, Ser. No. 697,515
Int. Cl.[2] F04D *29/34*
U.S. Cl. 416—210 R **2 Claims**



1. A fan blade spider arm mounting assembly of the type including hub and spider arm sheet metal workpieces for mounting fan blades, wherein the mounting assembly is defined by two sheet metal workpieces, each having integral angularly spaced fan blade mounting arms joined to a central hub portion at the root of each arm, the workpieces angularly aligned and in superimposed relation, to thereby define double-thickness hub and spider arm portions, an outwardly extending rib at the root portion of each spider arm, the ribs of one workpiece oppositely facing the ribs of the other workpiece to thereby define a closed cavity at each spider arm root portion, the cavities being of lesser width than the width of the spider arms, the hubs and arms of the two workpieces being in abutting, facing relation to each other, the two workpieces being fastened to each other at their arms radially outwardly of said root portions, whereby each spider arm is stiffened by both compressive and tensile loading of its corresponding cavity walls when a transverse force is applied to that arm.

4,053,261

IMPELLER FOR A HIGH-SPEED TURBOMACHINE

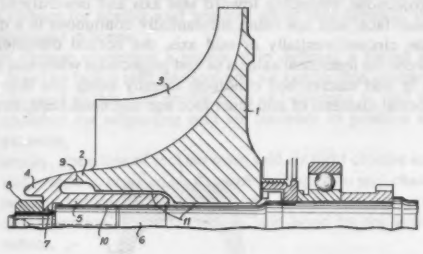
Gregor Pennig, Munich, Germany, assignor to MTU Motoren-Und Turbinen Union Munchen GmbH, Munich, Germany

Filed Dec. 1, 1975, Ser. No. 636,831
Claims priority, application Germany, Dec. 4, 1974, 2457231
Int. Cl.[2] F01D *5/04*
U.S. Cl. 416—244 A **6 Claims**

1. In an impeller wheel for a high-speed turbomachine having a shaft; and a hub frictionally fastened on said shaft through a tapered fit therebetween; the improvement comprising the combination of:
a. said impeller wheel being a centrifugal radially-shaped impeller having a predetermined width;
b. said hub being an elongate cylindrical sleeve extending into said impeller wheel in an axial direction;

c. said impeller wheel encompassing said shaft and said hub so as to form a narrow radial gap therebetween; and

d. said hub at the axial end thereof remote from said impeller wheel including a thin-walled, cylindrical connecting part



extending radially outwardly and being welded at its free end to said impeller wheel, said hub being an elongated cylindrical sleeve extending partly into a central bore of said impeller wheel in an axial direction.

4,053,262

AQUARIUM PUMP STRUCTURE

Tibor Horvath, Brooklyn, N.Y., assignor to Aquology Pet Corporation, Newark, N.J.

Filed Sept. 27, 1976, Ser. No. 726,932
Int. Cl.[2] F04B *17/00;* E04H *3/16*
U.S. Cl. 417—424 **8 Claims**

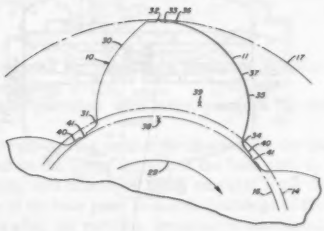
1. An aquarium pump having a housing with a large diameter upper cylindrical chamber having a top wall containing an aperture, a smaller diameter lower chamber containing an inlet, an outward flare between said lower chamber and said upper chamber, and a tangential outlet leading from said upper chamber, and a tangential outlet leading from said upper chamber, an impeller within said chambers of said housing having a larger portion in said upper chamber and a smaller portion extending downward into said lower chamber, a motor disposed over said housing having a shaft extending through said aperture in said top wall and mounting said impeller, and seal means disposed about said shaft adjacent to said aperture in said top wall; the improvement comprising, in combination, an upper portion of said housing including said top wall of said housing and at least part of said upper chamber, a lower portion of said housing extending downward below said upper portion of said housing, mating edges of said upper and lower portions of said housing, a motor mounting element having a top wall containing a central opening and having mounting flanges to which said motor is fixed with said motor shaft extending downward through said opening, skirt elements extending downard about said top wall of said motor mounting element, said top wall of said motor mounting element and said skirt elements nesting about said upper chamber, locking lugs projecting outwards from said skirt elements, and inwardly facing locking lips formed on said lower portion of said housing so that rotating said motor mounting element moves said lugs under said lips fixing said motor over said housing and holding said upper and lower portions of said housing together.

4,053,263

SCREW ROTOR MACHINE ROTORS AND METHOD OF MAKING

Robert A. Ingalls, Springfield, Vt., assignor to Joy Manufacturing Company, Pittsburgh, Pa.

Continuation of Ser. No. 374,032, June 27, 1973, abandoned.
This application Jan. 2, 1976, Ser. No. 645,981
Int. Cl.[2] F01C *1/16;* F04C *17/12;* F16H *55/08*
U.S. Cl. 418—201 **8 Claims**



8. A pair of helical rotors for a screw rotor machine comprising:

a male rotor and a female rotor adapted to be rotatably carried within a casing of said machine on respective parallel axes for intermeshing counterrotation of said male and female rotors on such respective axes,

said male rotor being rotatable about a central longitudinal axis and having a pitch circle centered on such axis, a plurality of elongated asymmetrical helical lobes extending longitudinally of said rotor and circumferentially spaced about such pitch circle so as to provide intervening grooves therebetween; a major portion of each of said lobes extending generally radially outward from such pitch circles, the profile of each of said lobes in a plane perpendicular to such axis having a tip portion and respective, generally convex leading and trailing flank portions extending intermediate said tip portion and the root portion of the respective adjacent groove; the profile of said leading flank portion consisting of involute curvature extending between said respective root portion and an intermediate point and traversing such pitch circle, and a circular arc portion extending between said intermediate point and said tip portion, said circular arc portion consisting of at least two circular arcs of different radii; and the profile of said trailing flank consisting of involute curvature extending between the other of said respective root portions and said tip portion and traversing said pitch circle, and

said female rotor being rotatable about a central longitudinal axis and having a pitch circle centered on such axis; a plurality of elongated asymmetrical helical lobes extending longitudinally of said rotor and circumferentially spaced about such pitch circle so as to provide intervening grooves therebetween; a major portion of each of said lobes extending generally radially inwardly of such pitch circle; the profile of each of said lobes in a plane perpendicular to such axis having a tip portion and respective generally concave leading and trailing flank portions

extending intermediate said tip portion and the root portion of the respective adjacent groove; the profile of each of said leading and trailing flank portions consisting of involute curvature extending between said tip portion and a respective intermediate point and traversing said pitch circle, and a circular arc portion extending between said respective intermediate points, said circular arc portion consisting of at least two circular arcs of different radii, whereby said rotors are adapted to form variable volume working chambers.

4,053,264

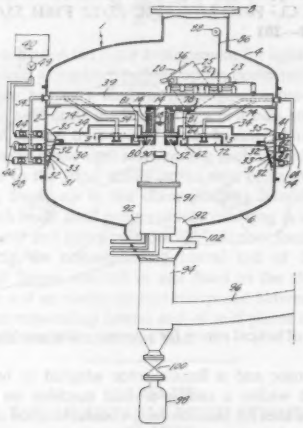
APPARATUS FOR MAKING METAL POWDER

Jerry A. King, Palm Beach Gardens, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 653,693, Jan. 30, 1976, Pat. No. 4,025,249. This application Dec. 6, 1976, Ser. No. 748,084

Int. Cl.² B22D *23/08*; B05B *1/14*

U.S. Cl. 425—8 **4 Claims**



1. An apparatus for producing metal powder comprising a housing, a disc means mounted for rotation, a nozzle plate means in said housing for directing an annular curtain of cooling fluid therefrom around said disc means, said nozzle plate means including three annular manifolds, a first annular inner manifold, a second annular middle manifold, and a third annular outer manifold, said first annular manifold having an annular nozzle, said second manifold having an annular baffle to properly distribute the flow therein, said third annular manifold having an annular distribution box therein for properly distributing the flow therein.

4,053,265

MOLD FOR RETREADING PNEUMATIC TIRES

Jan-Eric Lennart Wulker, Traslovslage, and Gote Bertil Sivert Bohman, Varberg, both of Sweden, assignors to Dacapo AB, Varberg, Sweden

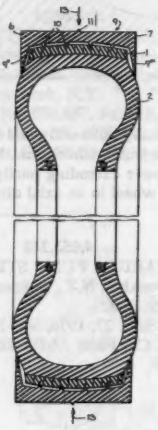
Continuation-in-part of Ser. No. 536,775, Dec. 27, 1974, abandoned, which is a continuation-in-part of Ser. No. 465,878, May 1, 1974, Pat. No. 3,983,193. This application Dec. 20, 1976, Ser. No. 752,026

Claims priority, application Sweden, Nov. 12, 1973, 7315263; Apr. 10, 1974, 7404835

Int. Cl.² B29H *5/04*

U.S. Cl. 425—20 **19 Claims**

1. A resilient, stretchable mold for embossing a pattern in a layer of unvulcanized rubber on the peripheral surface of a supporting body, said mold being made of an elastomeric material and having the shape of a generally circular, continuous band having an inner face extending around and facing the axis of said band, said inner face having a normal diameter when said mold is in its unstretched condition, said band having a plurality of spaced, pattern forming projections of a dimension in the radial direction extending from said inner face toward said axis and said band having a pair of axially spaced lips, one on one side and the other on the other side of said projections, extending toward said axis and inwardly of said inner face, said lips being substantially continuous in a direction circumferentially of said axis, the normal diameter between the innermost extents of said projections when said mold is in said unstretched condition thereby being less than said normal diameter of said inner face and said band being stretch-



able to a size such that the diameter between said innermost extents of said projections is at least equal to said normal diameter of said inner face, the elasticity of said elastomeric material being sufficient to permit stretching of said band to said size without exceeding the elastic limit thereof and said elastomeric material of said mold having a tensile strength at break of at least 500 p.s.i., an elongation at break at least 20 percent, a modulus at 300 percent elongation of at least 100 p.s.i., a hot tear strength of at least 100 p.s.i., a Shore hardness of at least 50, a compression set not exceeding 40 percent and a Lupke rebound in the range from 15 to 30 at temperatures up to about 70° C.

4,053,266

PROTECTIVE HOOD FOR PELLETING PRESSES

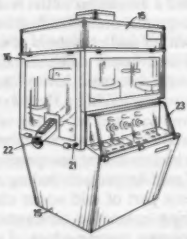
Konrad Friedrichs; Jürgen Hinzpeter, and Walter Braüner, all of Schwarzenbek, Germany, assignors to Fa. Wilhelm Fette GmbH, Schwarzenbek, Germany

Filed May 5, 1976, Ser. No. 683,594

Claims priority, application Germany, May 9, 1975, 2520691

Int. Cl.² B29C *3/00*

U.S. Cl. 425—73 **5 Claims**



1. A tablet compressing machine comprising a plurality of

lateral walls for enclosing a pelleting press and defining a protective hood, and wherein at least one of said walls includes an opening therein providing access to the hood interior, and a window hinged to said at least one wall for closing off said opening, and wherein said at least one wall comprises an air-tight closure for sealing said window about said opening, the improvement wherein:

said closure comprises a profile strip defining a sealed air chamber facing said window and air connecting channels disposed within said profile strip and opening to said air chamber for subjecting said air chamber to positive air pressure,

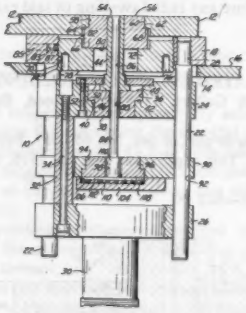
whereby, upon loss of seal between said air tight closure and said window, positive air pressure exiting from said chamber and between said window and said closure prevents contamination of the interior of said hood by the atmosphere.

4,053,267

DIE AND PUNCH ASSEMBLY FOR COMPACTING POWDER MATERIAL

Raymond P. DeSantis, Royal Oak, Mich., assignor to Wolverine Aluminum Corporation, Lincoln Park, Mich.

Filed Oct. 22, 1976, Ser. No. 734,970
Int. Cl.² B30B *11/02*
U.S. Cl. 425—78 **11 Claims**



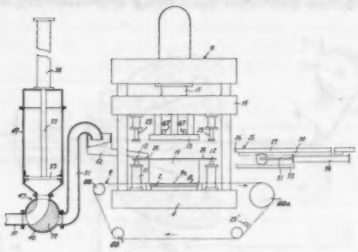
1. A unitary punch and die assembly for mounting on a powder compacting press, said assembly comprising a die plate, a pocket in said die plate a removable die bushing disposed in said pocket, at least one guidepost supported by said die plate and extending substantially parallel to the axis of said assembly, a pair of spaced apart plates slidably reciprocable in unison relative to said die plate and being supported and guided by said guidepost, a recess in one of said plates most proximate to said die plate, a punch member normally slidably engaged in a die bore in said die bushing and having an enlarged foot portion in said recess in said plate, means for clamping said punch on said plate, coupling means disposed below the other of said plates for connection to an actuating member dependent from said press, linking means interconnecting said plates for reciprocating said plates in unison, and a die bushing retainer in the form of a cylindrical member provided with a peripheral thread engageable with an internal thread formed in the pocket in said die plate, said thread being of an assymetrical shape with the driving side of said thread forming an acute angle with a plane perpendicular to the axis of said thread.

4,053,268

APPARATUS FOR MOLDING A SLURRY OF CALCIUM SILICATE CRYSTALS

Junji Kishino, Gifu, Japan, assignor to Kabushiki Kaisha Osaka Packing Seizosho, Japan

Filed Dec. 22, 1975, Ser. No. 642,652
Claims priority, application Japan, Dec. 27, 1974, 50-2661; Feb. 21, 1975, 50-24716
Int. Cl.² B28B *3/04*
U.S. Cl. 425—84 **8 Claims**



1. An apparatus for molding a slurry of calcium silicate crystals comprising:

a base plate provided with drain passages on the upper surface,

a net conveyor having meshes for dewatering the slurry and disposed on the upper surface of the base plate in contact therewith, said conveyor being movable from the upper surface of the base plate to enable discharge of the shaped product after the molding operation is completed,

a frame-shaped lower mold movable between a position wherein said mold is disposed on said net conveyor immediately above said base plate, and a position above said net conveyor,

an upper mold provided on the lower surface thereof with dewatering means for dewatering the slurry, located above and movable into engagement with the lower mold to press and dewater the slurry in cooperation with the lower mold and to thereby form a shaped product,

first drive means operatively associated with said lower mold for lowering said lower mold onto the net conveyor immediately above said base plate and for raising said lower mold relative to said net conveyor,

second drive means operatively associated with said upper mold for lowering said upper mold into contact with said lower mold and for raising said upper mold, and

lower mold holder means operatively associated with said lower mold for pressing said lower mold downwardly during the molding operation independently of the movement of said upper mold and for holding said lower mold so that said upper and lower molds can be raised together by said first drive means, said lower mold holder means allowing relative movement between said molds subsequent to their being raised together to cause the discharge of the shaped product.

4,053,269

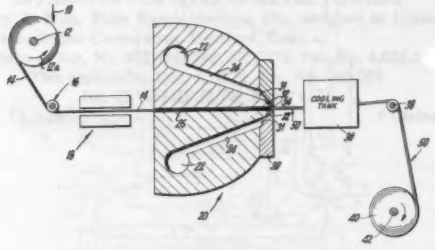
APPARATUS FOR FORMING A COMPOSITE TAPE

Sidney Levy, 145 W. Cuthbert Blvd., Oaklyn, N.J. 08107

Continuation-in-part of Ser. No. 341,238, March 14, 1973, Pat. No. 3,917,890, which is a continuation-in-part of Ser. No. 887,990, Dec. 24, 1969, abandoned. This application Feb. 26, 1975, Ser. No. 553,280
Int. Cl.² B29F *3/10*
U.S. Cl. 425—113 **7 Claims**

1. An extrusion die for coating a foraminous core material comprising an extrusion member having a channel extending therethrough dimensioned and configurated to substantially correspond to external dimensions of the core material to be

coated to permit passage of the core material through said channel with clearance, said channel having an entry end and an exit end, a passageway provided on each side of said channel in said extrusion member which merges with and opens into said channel proximate to said exit end and a die orifice where the core material leaves said extrusion member, a section disposed on one side of and adjacent to a point of merging of said passageways with said channel at said exit end, said section providing a die lip area communicating with said die orifice on an opposite side thereof, said passageways having lengths of approximately 0.25 inches with an effective dimension across their flow path being approximately 0.05 inches,



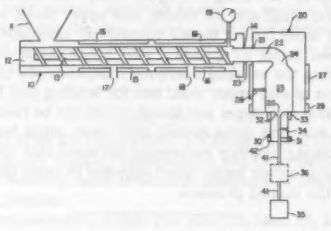
said die lip area having a length along the flow path of approximately 0.015 inches with an effective dimension across the flow path of approximately 0.02 inches, said dimensions of said passageways and of said die lip area permitting a coating of resin material under suitable extrusion pressures to encapsulate the core material during the course of passage through the extrusion die and prior to its emergence therefrom, whereby controlled application of pressure on the extruded resin material by selection of the extrusion die dimensions forces the resin material into interstices of the foraminous core material prior to emergence from the die orifice to impart a layer of resin material about the core material.

4,053,270

APPARATUS FOR THE EXTRUSION OF HIGHLY ORIENTED POLYMERIC MATERIALS

John R. Collier, Athens, Ohio, and Thomas Y. T. Tam, Chester, Va., assignors to Research Corporation, New York, N.Y.

Filed Jan. 29, 1976, Ser. No. 653,584
Int. Cl.[2] B29F *3/08*
U.S. Cl. 425—144 **9 Claims**



1. An extrusion apparatus for producing a highly oriented extrudate of a thermoplastic polymeric material, comprising:

a. a plasticating extruder means for providing a melt of said polymeric material and for feeding said melt under pressure through a discharge opening in said extruder means;

b. an elongational flow pattern-developing reservoir means having an inlet opening communicating with said discharge opening of said extruder means, an enlarged diameter flow cavity, and a constricted discharge orifice, the relative geometries of said flow cavity and said constricted discharge orifice being such as to develop within the molten polymeric material flowing from said extruder means through said reservoir means an elongational flow pattern which induces molecular orientation in the direction of flow within said molten polymeric material and elevates the effective melting point of said flowing polymeric material;

c. an orientation-retaining extrusion die means provided with an orifice extending therethrough, said die orifice having an inlet end and an outlet end, said constricted discharge orifice of said reservoir means opening into said inlet end of said die orifice so as to permit flow of the oriented molten polymeric material from said reservoir means into said die means without any increase in the cross-sectional area of flow, said die orifice having a cross-sectional area no greater than that of said constricted discharge orifice of said reservoir means so as to radially constrain said oriented molten polymeric material flowing therethrough against its natural tendency to lose its molecular orientation by radial swelling;

d. temperature control means for maintaining the temperature of said flowing molten polymeric material at at least about said elevated effective melting point thereof in said reservoir means and said inlet end of said die orifice and for maintaining in said die orifice an axial temperature gradient descending in the direction of flow through a median die temperature substantially equal to the normal melting point of said polymeric material so that solidification of said polymeric material will be inhibited in the entrance region of said die means and initiated within said die means; and

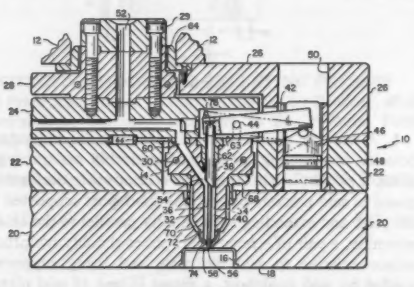
e. a variable speed take-up means for withdrawing from said outlet end of said die orifice a partially solidified extrudate of said polymeric material at a controlled draw rate such that said extrudate becomes completely solidified immediately after exiting from said outlet end of said die orifice and before any radial swelling of said extrudate can occur.

4,053,271

VALVE-GATED INJECTION MOLDING MECHANISM

Jobst Ulrich Gellert, 11 Newton Road, Brampton, Ontario, Canada

Continuation-in-part of Ser. No. 655,057, Feb. 4, 1976, Pat. No. 4,013,393. This application Oct. 12, 1976, Ser. No. 731,510
Int. Cl.[2] B29F *1/00*
U.S. Cl. 425—562 **3 Claims**



1. In an injection molding valve-gated mechanism having a vertical valve pin which reciprocates in a passage bore in a heater located in a mold to control flow of molten plastic from a molding machine to a cavity, the heater having a lower nozzle portion which is separated from the surrounding mold by a circumferential air space and through which the valve pin projects to provide a valve in a gate to the cavity, the improvement comprising a generally cylindrical seal having a vertical inner wall, a vertical outer wall and a lower surface, said seal being horizontally located in the air space between the lower nozzle portion of the heater and the wall of a recess in the mold, said seal being located where the air space flares out-

wardly upward, the lower surface extending upwardly from the mold across the air space to an overhanging shoulder on lower nozzle portion of the heater, the lower surface having a uniform V-shaped cross section formed by a first face extending diagonally outwardly upward from the inner surface and a second face extending diagonally inwardly upward from the outer surface, the lower surface forming an inner lip defined between the inner surface and the first diagonal face and an outer lip defined between the outer surface and the second diagonal face, the seal being positioned so that only a portion of the outer lip abuts on the mold to reduce heat transfer through the seal from the lower nozzle portion of the heater to the mold.

4,053,272

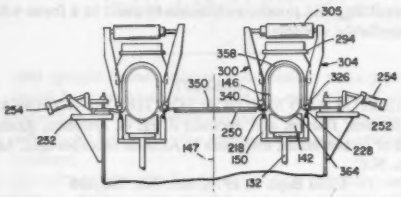
APPARATUS AND METHOD FOR FORMING A TUBE ARTICLE ON A CORE

Charles E. Grawey, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 588,732, June 20, 1975, which is a continuation-in-part of Ser. No. 385,956, Aug. 6, 1973, abandoned. This application Nov. 15, 1976, Ser. No. 742,389

Int. Cl.² B29C *17/04*

U.S. Cl. 425—302.1 **18 Claims**



1. Apparatus for forming a portion of a tube on a toroidal core from elastomeric sheet material comprising:

frame means;

a toroidal core support means operatively associated with the frame means for supporting the toroidal core;

means operatively associated with the frame means for positioning and supporting a sheet of elastomeric material adjacent the so-supported core along one side of the so-supported core;

means for depositing elastomeric material of the sheet thereof onto the so-supported toroidal core along a continuous path thereof; and

means for selectively applying force to an annular portion of the elastomeric material associated with the core to urge an annular portion of elastomeric material against the so-supporting core.

4,053,273

APPARATUS FOR THE MANUFACTURE OF PRESSED BODIES OF DEPOLARIZING MATERIAL FOR GALVANIC CELLS

Ernst Karobath; Leopold Rippel; Wolfgang Pulitzer, and Hans Schmidinger, all of Vienna, Austria, assignors to Telephon- und Telegraphen-Fabriks-Aktiengesellschaft Kapsch & Sohne in Wien, Vienna, Austria

Filed Mar. 15, 1976, Ser. No. 667,100

Claims priority, application Austria, Apr. 4, 1975, 2573/75

Int. Cl.² B30B *11/10, 15/30*

U.S. Cl. 425—357 **12 Claims**

1. An apparatus for the manufacture of a pressed body of depolarizing material for use in a galvanic cell, comprising, in combination:

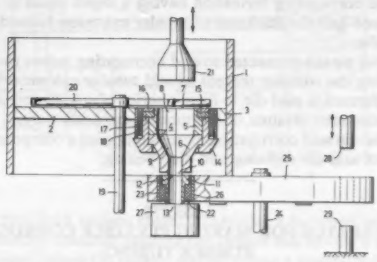
at least one elongated mold having a substantially uniform cross section and being open at each end;

a pre-mold having a capacity greater than that of said mold and being open at each end, one of the openings of said pre-mold being generally the same size and shape as the openings of said mold;

filling means operable for filling said pre-mold with said depolarizing material;

pressing means operable for cooperating with said pre-mold to compress and discharge the depolarizing material in said pre-mold to said mold and operable for simultaneously cooperating with said mold to press the, depolarizing material therein;

moving means operable to move said mold to align one of its openings with said one opening of said pre-mold and to



move said mold after it receives the compressed depolarizing material; and

shearing means operable to cooperate with said moving means to shear off a portion of the compressed depolarizing material extending above the top of said mold;

said pressing means and said moving means operable for cooperating with each other whereby said mold is moved to a position below said pre-mold, receives the compressed depolarizing material, and is thereafter moved away so that another mold can be moved to the position below said pre-mold.

4,053,274

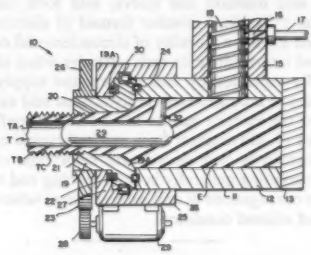
TUBE WALL FORMING APPARATUS

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Filed Jan. 28, 1975, Ser. No. 544,834

Int. Cl.² B29D *23/04*

U.S. Cl. 425—381 **7 Claims**



1. An apparatus for continuously extruding tubing having a smooth interior wall surface which has a substantially constant internal diameter and having an exterior wall which varies in configuration along the length thereof wherein said configuration is in the form of corrugations having a depth equal to at least one-half of the wall thickness of the extruded tube to provide a flexible tube having a resistance free flow path comprising:

an extruder including an extrusion die having a die opening, a mandrel supported within said die and extending beyond

said die opening to define with said die opening an annular passageway,

means connected to said die to define a chamber adapted to be filled with an extrudate,

means associated with said chamber for forcing the extrudate about said mandrel and through said annular passageway,

said mandrel having a smooth outer surface to form the tubular extrusion having a smooth regularly shaped internal surface having a substantially constant diameter,

corrugating means operatively associated with said die and having a corrugating formation for engaging the exterior surface of the tubular extrusion formed in said die,

said corrugating formation having a depth equal to at least one-half the thickness of tubular extrusion formed in said die,

drive means connected to said corrugating means for effecting the rotation thereof as said tubular extrusion is being formed in said die to form a series of spiral protrusions in the outer stratum of the tubular extrusion only,

wherein said corrugating means comprises a component part of said die defining said die opening.

4,053,275

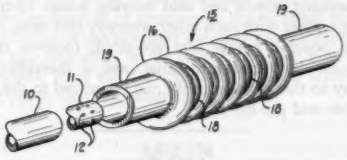
APPARATUS FOR MAKING FLEXIBLE CORRUGATED RUBBER TUBING

Vance M. Kramer, Sr., 402 E. Boundry Road, Perrysburg, Ohio 43551, and Vance M. Kramer, Jr., 1913 Greendale Ave., Findlay, Ohio 45840

Filed Apr. 12, 1976, Ser. No. 676,281

Int. Cl.² B29C *17/04*

U.S. Cl. 425—389 **9 Claims**



1. In apparatus for making flexible corrugated tubing from an extruded sleeve of uncured rubber and including a forming mandrel adapted to receive said sleeve and means for supplying air under pressure to the interior of said sleeve for radially expanding said sleeve, the improvement which comprises:

an axially extensible external form adapted to be disposed over said mandrel and sleeve, said form comprising a tubular cylindrical member formed of elastomeric material and having a plurality of circumferential corrugations formed intermediate its ends whereby when said sleeve is radially expanded by said air pressure supplying means, said sleeve is bulged outwardly against said external form so that the exterior surface of said sleeve conforms to the surface of said external form and embryonic corrugations are formed in said sleeve, said embryonic corrugations corresponding generally in axial spacing and radial depth to the corrugations in said external form when in its unextended relaxed condition.

4,053,276

PRESS FOR EXERTING A PRESSURE OVER AN AREA

Karl-Heinz Ahrweiler; Kurt Quoos, and Eduard Kusters, all of Krefeld, Germany, assignors to Eduard Kusters, Krefeld, Germany

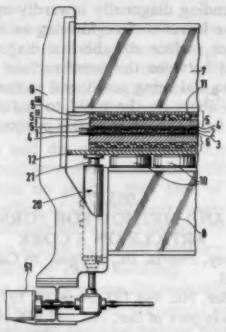
Filed Mar. 17, 1976, Ser. No. 667,546

Claims priority, application Germany, Mar. 18, 1975, 2511873

Int. Cl.² B29C *3/00*

U.S. Cl. 425—406 **9 Claims**

1. In a press for exerting a pressure over an area in a longitudinal section of a sheet, particularly a press for producing wood chip board and similar materials, having two opposed pressure plates which are braced against respective support structures provided outside the pressing area between said plates and in which the pressure is transmitted from at least one support structure to at least one associated pressure plate by



supplying a pressure medium to several pressure elements disposed in lines across the sheet, the improvement comprising means associated with at least some of the pressure elements for permitting said pressure elements to exert to a force which is controllably variable.

4,053,277

APPARATUS AND METHOD FOR HEATING THREADS

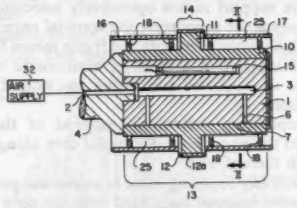
Cornelis Bos, Dieren, and Jacobus J. H. G. Daamen, Arnhem, both of Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Filed Sept. 3, 1976, Ser. No. 720,496

Claims priority, application Netherlands, Sept. 5, 1975, 7510463

Int. Cl.² F27B *9/28*

U.S. Cl. 432—60 **7 Claims**



1. An apparatus for heating threads comprising: a core fixedly mounted to a frame and having a cylindrical surface; a cylindrical jacket rotatably mounted over said core and separable by a narrow gap from said core, a portion of the jacket having thermal insulation means on its exterior surface, the remaining exterior surface being the running surface for the threads; means for heating the core; and means for supplying a compressed gas to the gap between the core and the jacket.

4,053,278

TUNNEL KILN

Werner Fleischmann, Frankfurt; Heinz-Otto Reinkenobbe, and Manfred Schmidt, both of Ratingen, all of Germany, assignors to "Keramag" Keramische Werke AG, Ratingen and Firma Adolf A. Fleischmann, Frankfurt, both of, Germany

Filed Sept. 7, 1976, Ser. No. 720,738

Claims priority, application Germany, Sept. 11, 1975, 2540401

Int. Cl.² F27B *9/00*; F27D *1/00*

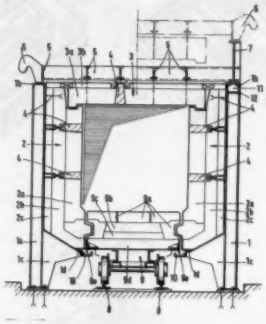
U.S. Cl. 432—137 **16 Claims**

1. A structure for a tunnel kiln enclosure of substantially rectangular interior cross-sectional outline, especially a kiln for

the firing of ceramic objects on a production line basis, under continuous or intermittent motion, the tunnel kiln structure comprising in combination:

a tunnel frame of structural steel extending the length of the tunnel kiln and including upright frame sections on both sides thereof;

a plurality of longitudinally adjoining tunnel kiln sections, each of said kiln sections including a unitary prefabricated heat resistant ceiling panel extending transversely over the entire width of the kiln enclosure and being supported by



said upright frame sections, and a similar unitary prefabricated heat resistant side panel on each side of the kiln extending over the entire height of the kiln enclosure, the side panels being likewise supported on said upright frame sections;

a plurality of longitudinally adjoining rail cars carrying thereon similar unitary prefabricated heat resistant bottom panels which form a movable bottom for the tunnel kiln enclosure; and

guide rails supporting the rail cars, the rails being mounted in parallel alignment with the tunnel frame.

4,053,279

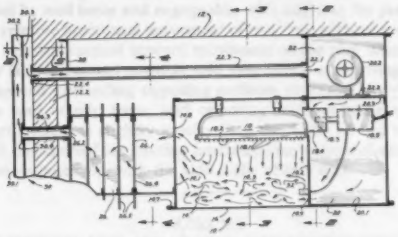
FUEL-FIRED, RADIANT HEATER

John E. Eichenlaub, 5212 Kellogg Ave., Edina, Minn. 55424

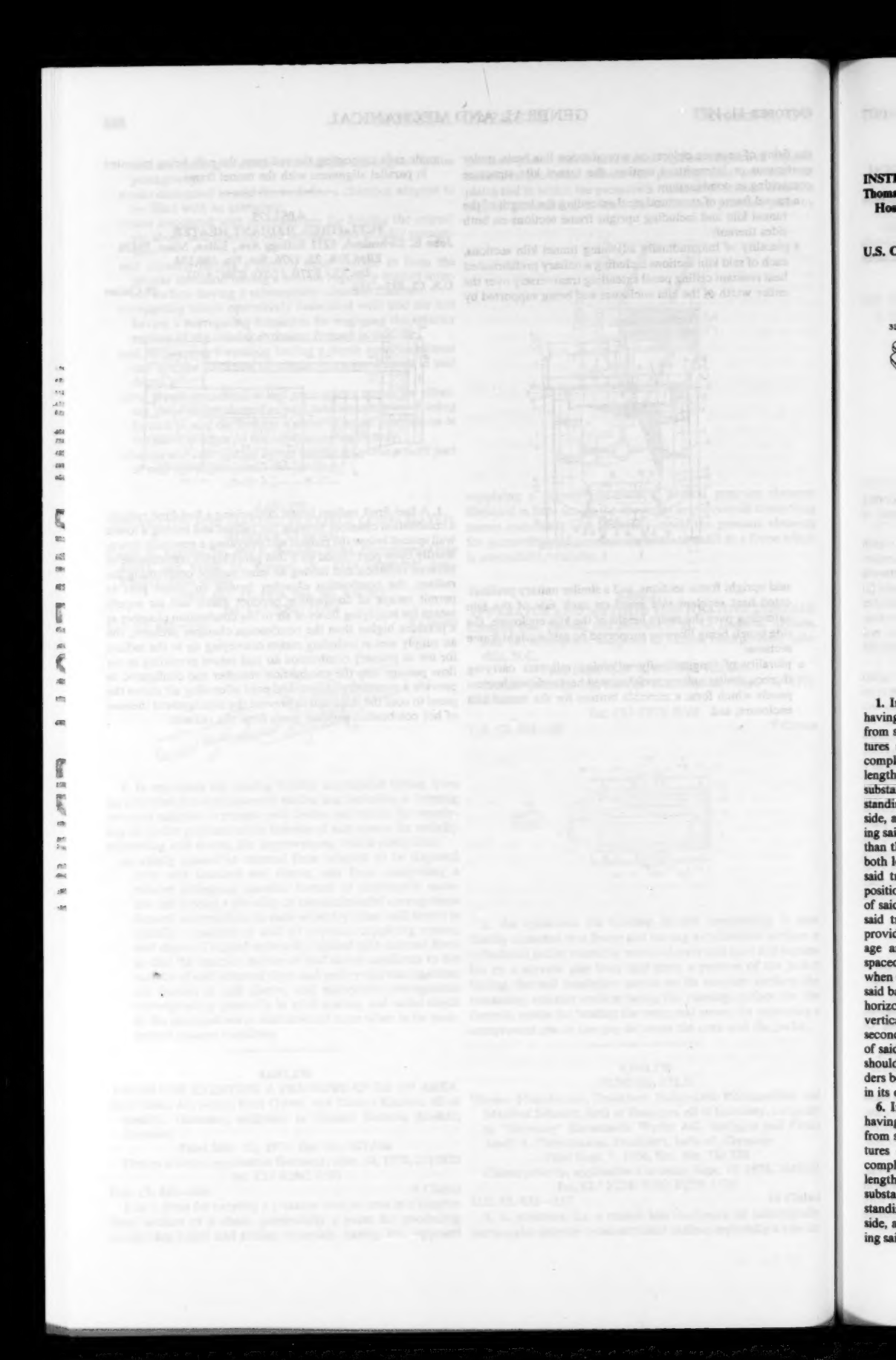
Filed Feb. 23, 1976, Ser. No. 660,134

Int. Cl.[2] F27B *17/00*; F24C *3/02*

U.S. Cl. 432—222 **19 Claims**



1. A fuel-fired, radiant heater comprising a fuel-fired radiant; a combustion chamber housing the radiant and having a lower wall spaced below the radiant and providing a generally downwardly open port closed by a thin panel highly transmissive of infrared radiation and having an inner surface confronting the radiant, the combustion chamber having an outlet port to permit escape of combustion product gases; and air supply means for supplying flows of air to the combustion chamber at a pressure higher than the combustion chamber pressure, the air supply means including means conveying air to the radiant for use as primary combustion air and means providing an air flow passage into the combustion chamber and configured to provide a constantly replenished pool of cooling air above the panel to cool the same and to prevent the impingement thereon of hot combustion product gases from the radiant.

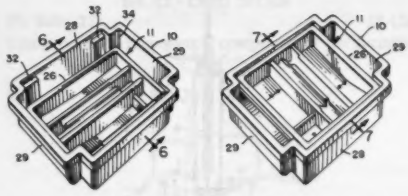


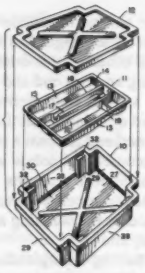
CHEMICAL

4,053,280
INSTRUMENT TRAY AND SOAK BASIN COMBINATION

Thomas E. Salisbury, Highland Park, Ill., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Apr. 23, 1976, Ser. No. 679,570
Int. Cl.[2] A61L *3/00*; B08B *3/04*; B65D *81/00*
U.S. Cl. 21—87 10 Claims





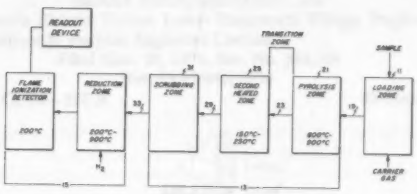
1. In combination, a generally rectangular instrument tray having a bottom wall and having side and end walls upstanding from said bottom wall, at least one of said walls having apertures so positioned therein to provide for the substantially complete drainage of fluid from said tray; said tray having a length, measured from one upstanding end wall to the other, substantially greater than its width, measured from one upstanding side wall to the other; and a soak basin having bottom, side, and end walls defining a chamber for removably receiving said tray; said chamber having a depth substantially greater than the height of the upstanding walls of said tray and being both longer and wider than said length of said tray; whereby, said tray is selectively receivable in said chamber in a first position wherein the length of said tray extends longitudinally of said basin and in a second position wherein said length of said tray extends transversely of said basin; support means provided by said basin for supporting said tray in a fluid drainage and instrument storage position with its bottom wall spaced a substantial distance above the basin's bottom wall when said tray is in its second position; stop means provided by said basin and engagable with said tray for preventing relative horizontal movement of said tray without restraining relative vertical upward movement of the tray when said tray is in its second position; and flanges projecting outwardly from the top of said end walls of said tray; said support means comprising shoulders provided by said side walls of said basin; said shoulders being engagable with said flanges for supporting said tray in its elevated second position.

6. In combination, a generally rectangular instrument tray having a bottom wall and having side and end walls upstanding from said bottom wall, at least one of said walls having apertures so positioned therein to provide for the substantially complete drainage of fluid from said tray; said tray having a length, measured from one upstanding end wall to the other, substantially greater than its width, measured from one upstanding side wall to the other; and a soak basin having bottom, side, and end walls defining a chamber for removably receiving said tray; said chamber having a depth substantially greater than the height of the upstanding walls of said tray and being both longer and wider than said length of said tray; whereby, said tray is selectively receivable in said chamber in a first position wherein the length of said tray extends longitudinally of said basin and in a second position wherein said length of said tray extends transversely of said basin; support means provided by said basin for supporting said tray in a fluid drainage and instrument storage position with its bottom wall spaced a substantial distance above the basin's bottom wall when said tray is in its second position; and stop means provided by said basin and engageable with said tray for preventing relative horizontal movement of said tray when said tray is in its second position; said stop means comprising pairs of spaced upstanding opposing surfaces provided along each side wall of said basin; said opposing surfaces being spaced apart a distance slightly greater than the width of said tray at each end thereof for limiting horizontal movement of said tray upon engagement with the side walls of said tray.

4,053,281
METHOD AND APPARATUS FOR DETERMINING ORGANIC CARBON IN SULFUREOUS COMPOUNDS

Melvin Keith Carter, Saratoga, Calif., assignor to Envirotech Corporation, Menlo Park, Calif.

Filed Jan. 31, 1975, Ser. No. 545,853
Int. Cl.[2] G01N *31/12*
U.S. Cl. 23—230 PC 13 Claims



1. A process for determining trace quantities of organic carbon in sulfureous mixtures and compounds comprising the steps of:

a. introducing small predetermined sample quantities of sulfureous matter into a first zone of a sealed chamber;

b. heating the introduced matter in the first zone to a temperature sufficient to decompose the matter to form sulfur dioxide and sulfur trioxide gases and to oxidize organic substances in the matter to form carbon dioxide gas;

c. conveying aforementioned gases from the first zone to subsequent zones in the chamber;

d. scrubbing the gases from the first zone in a scrubbing zone by the usage of a transition metal amine complex which reacts to remove sulfureous compounds from the gases without reaction with carbon dioxide gas; and

e. analyzing the gases which exit from the scrubbing zone to determine the carbon dioxide content of the gases.

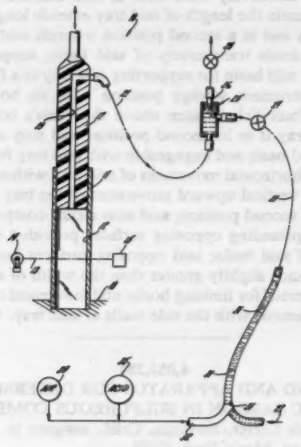
4,053,282
METHOD AND APPARATUS FOR SAMPLING IMPURE WATER

Clifford C. Hach, and Michael D. Buck, both of Ames, Iowa, assignors to Hach Chemical Company, Ames, Iowa

Filed Feb. 26, 1976, Ser. No. 661,604
Int. Cl.[2] G01N *1/10, 21/00, 33/18*
U.S. Cl. 23—230 R 7 Claims

1. In a liquid analyzer having a colorimetric cell and a pump for pulling liquid into said cell and expelling liquid from the cell, the combination comprising, a liquid sample supply tube running from a body of liquid to be tested to said pump, means for injecting substantial air bubbles into said tube adjacent the tube end in said body of liquid, and a T-conector in said tube

near the tube end at said pump, said connector having a vertically extending section for collecting gas bubbles and a lower



section connected to said pump for supplying liquid without bubbles to said pump and receiving liquid from said pump for ejection of said gas bubbles from said T-connector.

4,053,283

MIXING DEVICE FOR MIXING TOGETHER MULTI-COMPONENT PLASTICS MATERIALS

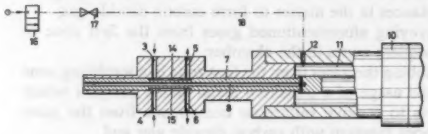
Fritz W. Schneider; Helmut Clausen, and Manfred Kelterbaum, all of Strasslach, Germany, assignors to Elastogran Maschinenbau GmbH & Co., Strasslach near Munich, Germany

Filed June 30, 1976, Ser. No. 701,348

Claims priority, application Germany, Aug. 29, 1975, 2538437

Int. Cl.[2] C08J 9/30

U.S. Cl. 23—252 R **4 Claims**



1. In a mixing device for mixing together multi-component plastics materials and air to influence the cell structure of the resulting mixed plastics, said device comprising a housing defining a mixing chamber, means defining supply ducts communicating with said chamber for the supply of said components to said chamber, a piston reciprocably mounted in said chamber and means for reciprocating said piston between a first position in which said supply ducts are shut off from said chamber and a second position in which said supply ducts are communicated with said chamber, the improvement comprising means defining an air supply passage extending axially along said piston in continuous communication with said chamber and means for connecting said passage to a supply of air under pressure to enable said air under pressure to be supplied together with said components into said mixing chamber.

4,053,284

CONTINUOUS FLOW APPARATUS FOR BIOLOGICAL TESTING

Nancy Ann Posch, La Crescenta, Calif., assignor to Akzona Incorporated, Asheville, N.C.

Filed Mar. 10, 1976, Ser. No. 665,358

Int. Cl.[2] G01N 33/16, 21/00, 31/14

U.S. Cl. 23—259 **15 Claims**

1. Test apparatus for the performance of solid supported immunochemical reactions in diagnostic tests on samples of blood, serum, urine, and other liquids comprising:

a reaction vessel having an open end and a closed end, which vessel (1) is fitted with a fluid permeable grid member above the closed end defining a reaction chamber between the grid and the closed end to form a reaction zone and (2) has one or more geometrical solids within said chamber with immunochemical test reagents supported thereon, said chamber adapted to receive a washing apparatus, and (3) is adapted to receive the washing apparatus in vacuum sealing engagement; and

a washing apparatus having a longitudinal axis and adapted for insertion (a) into the reaction vessel through the open end thereof to form a vacuum seal therewith, and (b) into the reaction chamber, comprising (1) a container to receive fluid, said container adapted to communicate with a source of fluid located externally to the reaction vessel, said container being fitted with a plurality of ports in a band, each port equidistant from another for continuously ejecting fluid from the container into the reaction vessel, and for washing the reaction vessel and the geometrical solids therein, and (2) an elongated vacuum conduit passing through the container in parallel to the longitudinal axis thereof, said conduit having a first vent adapted to communicate with a vacuum source and a second vent communicating with the interior of the reaction chamber to capture and remove fluid as said fluid is released from the container.

4,053,285

PROCESS FOR REDUCING THE SULFIDE SULFUR CONTENT OF CHAR WITH CARBON DIOXIDE AND H_2O

Leon Robinson, Houston, Tex., and Allan Sass, Los Angeles, Calif., assignors to Occidental Research Corporation, La Verne, Calif.

Continuation-in-part of Ser. No. 461,992, April 18, 1974, abandoned. This application Jan. 15, 1976, Ser. No. 649,355

Int. Cl.[2] C10L 9/10; C10B 57/00

U.S. Cl. 44—1 F **10 Claims**

1. In a method for reducing the sulfide sulfur content of char, the step comprising treating said char with a gaseous mixture of carbon dioxide and H_2O at a temperature of from about 500° F to about 1600° F.

5. In a method for reducing the sulfide sulfur content of char, wherein said char has been partially desulfurized by treatment with hydrogen gas, the step comprising treating said char with a gaseous mixture of carbon dioxide and H_2O at a temperature from about 500° F to about 1600° F.

4,053,286

PROCESS FOR THE PREPARATION OF CEPHALOSPORIN ANTIBIOTICS

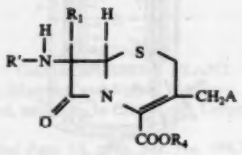
Leonard M. Weinstock, Belle Mead, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 507,473, Sept. 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 420,418, Nov. 30, 1973, abandoned. This application May 24, 1976, Ser. No. 689,408

Int. Cl.[2] C07D *501/04*

U.S. Cl. 544—21 **18 Claims**

1. The process of preparing a compound of the formula:

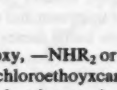


wherein

R_1 is hydrogen or methoxy;

A is carbamoyloxy or loweralkanoyloxy;

R′ is an acyl group having the formula:



wherein

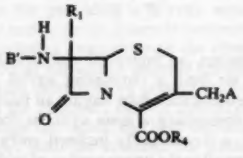
Y is hydrogen, carboxy, $—NHR_2$ or $—OR_5$;

R_2 is hydrogen, trichloroethoyxcarbonyl, tertiary butoxycarbonyl, benzoylmethoxycarbonyl, trimethylsilyl, p-methoxybenzyloxy, 2-nitrophenylsulfenyl, 2,4,-dinitrophenylsulfenyl, chloroacetyl, p-nitrophenylthio, p-nitrobenzenesulfonyl, p-toluenesulfonyl, methanesulfonyl, benzoyl, p-chlorobenzoyl, p-nitrobenzoyl or toluoyl;

R_3 is phenyl, 2-thienyl, 3-thienyl, 2-furyl, 3-furyl, 1-tetrazoyl, C_1–C_4 loweralkylphenyl, halophenyl, hydroxyphenyl, a C_1–C_4 loweralkyloxyphenyl;

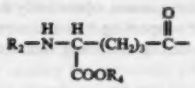
R_4 is methyl, ethyl, tertiary butyl, phthalimidomethyl, succinimidomethyl, phenacyl, p-bromophenacyl, 2,2,2-trichloroethyl, 2-methylthioethyl, 2-(p-methylphenyl)ethyl, 2-(p-methylphenyl)sulfonylethyl, 2-methylaminoethyl, 2-chloro-(or bromo)ethyl, benzyl, p-nitrobenzyl, p-methoxybenzyl, 3,5-dinitrobenzyl, 2,4,6-trimethylbenzyl, 3,5-dichloro-4-hydroxybenzyl, benzhydryl, p-methoxybenzhydryl, acetoxymethyl, pivaloyloxymethyl, methoxymethyl, p-nitrophenyl or 3,5-dinitrophenyl, acetyl, benzoyl or thienylacetyl;

R_5 is hydrogen, methyl, ethyl, phenacyl, p-bromophenacyl, 2,2,2-trichloroethyl, benzyl, p-nitrobenzyl, p-methoxybenzyl, 3,5-dinitrobenzyl, 2,4,6-trimethylbenzyl, benzhydryl, p-methoxybenzhydryl or methoxymethyl; which consisting essentially of reacting a compound of the formula:



wherein

B′ is



wherein

R_2, R_4 are as defined above; or an acyl group R′ which is different than the final desired substituent; with an acylating agent having the formula:

wherein

R_3 and Y are the same as before defined, in the presence of a synthetic zeolite of the type 3A, 4A, 5A, or 13X, containing from about 0 to 30% by weight water of hydration; and then cleaving B′ by either prolonging the reaction time to between about 30 minutes to about 30 hours; or by adding a loweralkanol of 1 to 6 carbon atoms, loweralkylthiol of 1 to 6 carbon atoms, benzyl alcohol or hydrochloric acid to yield the final product, and recovering the final product.

4,053,287

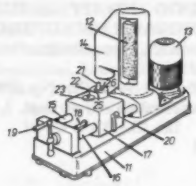
BRAKE SHOE GRINDING JIG

Elsworth Richard Delves, Lower Hackworth Village, England, assignor to Purpose Engineers Limited

Filed Mar. 10, 1976, Ser. No. 665,384

Int. Cl.[2] B24B *5/36*

U.S. Cl. 51—105 R **10 Claims**



1. A jig for use in grinding brake shoe linings of brake shoes having pivot means at one end which engage respective spaced pivot pins in the brake drum, the jig comprising a turntable, having central swivel means, mounting means on the turntable, means for radially adjusting the mounting means relative to the swivel means, a pair of pivot pins in fixed spaced relationship and provided on the mounting means, each said pin engaging, in use, with the pivot means of one of the brake shoe linings to be ground, angle setting means on the turntable and diametrically opposite said mounting means, said angle setting means defining a variable dimension abutment whereby the ends of the brake shoes opposite to said mounting means abut opposite sides of the abutment, whereby the brake shoe linings can be positioned substantially on the circumference they occupy in a brake drum by adjustment of the mounting means and setting of the angle setting means.

4,053,288

HAND FED GLASS BEVELING APPARATUS

Lee H. Barron, Sr., 4515 Alta Canyada Road, La Canada, Calif. 91011

Filed Mar. 30, 1976, Ser. No. 672,029

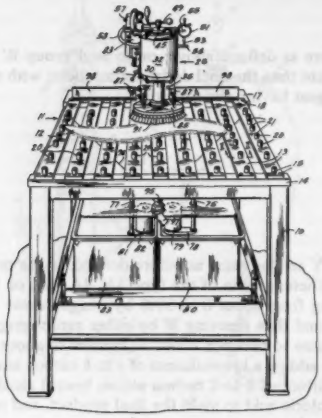
Int. Cl.[2] B24B *9/10, 41/06*

U.S. Cl. 51—109 R **28 Claims**

16. Glass beveling apparatus including upwardly facing

means for supporting a flat glass piece to be beveled, and grinding and polishing means operatively related to the supporting means, said supporting means comprising:

a plurality of upwardly extending supporting knobs;



means carrying said knobs in spaced relation to one another and with crown surfaces of the knobs in a common glass supporting plane;

and means securing said knobs to said carrying means immovably and in fixed positions relative to said carrying means.

4,053,289

GRINDING METHOD AND APPARATUS WITH METAL REMOVAL RATE CONTROL

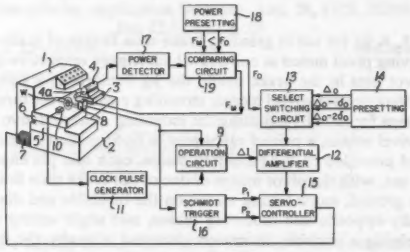
Youji Tatsumi, Funabashi, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Sept. 3, 1975, Ser. No. 609,948

Claims priority, application Japan, Sept. 3, 1974, 49-101241

Int. Cl.² B24B *49/04*

U.S. Cl. 51—281 R **6 Claims**



1. A grinding method with metal removal rate control comprising: continuously or intermittently measuring the rate of metal removal of a workpiece during a grinding operation; comparing the measured metal removal rate with a predetermined metal removal program value and providing a difference signal indicative of the difference between the actual metal removal rate from the program value; controlling the grinding operation in accordance with the difference signal to suppress the difference signal; measuring grinding tool deterioration during grinding; and selecting a lower predetermined program value of metal removal rate for determining the difference signal when the measured grinding tool deterioration exceeds a certain amount.

4,053,290

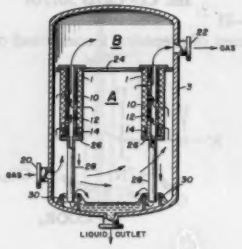
FIBER BED SEPARATOR

Gilbert K. C. Chen, Manchester, and Lincoln B. Crosby, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 18, 1976, Ser. No. 733,661

Int. Cl.² B01D *19/00*

U.S. Cl. 55—187 **28 Claims**



1. In a fiber bed separator for separation of liquid particulates from a moving gas stream comprising at least one fiber bed element disposed in a substantially vertical position wherein the collected liquid phase drains to the bottom of the fiber bed element, the improvement whereby bubble re-entrainment of the collected liquid phase from the bottom downstream surface of the fiber bed may be substantially reduced or eliminated, which comprises a gas flow baffle means disposed through the entire bottom portion of each fiber bed element intermediate the upstream and downstream surfaces of the fiber bed, said gas flow baffle means extending substantially vertically from the bottom of that portion of said fiber bed which is on the downstream side of said baffle means to a height such that said downstream portion of fiber bed in the lee side of said baffle means is sufficiently shielded from gas flow that the bed velocity of any gas flowing through said shielded portion of the fiber bed is below bubble re-entrainment velocity.

4,053,291

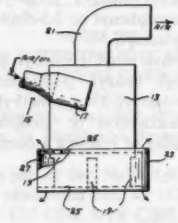
CYLINDRICAL DEAERATOR

David L. Sims, West Palm Beach, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 18, 1976, Ser. No. 715,594

Int. Cl.² B01D *19/00*

U.S. Cl. 55—204 **1 Claim**



1. In combination, an improved cylindrical deaerator for separating the air from a circulating air/oil mixture and a curved elongated entrance tube having an inlet and an outlet, said deaerator comprising a main cylinder for receiving the air/oil mixture, a downwardly inclined entry tube attached through the sidewall in the upper portion of said main cylinder, said entry tube having a round inlet and a flattened outlet to supply the air/oil mixture tangential to the wall of said main

cylinder, the outlet of said entrance tube being operatively connected to the inlet of the entry tube on said main cylinder, and a series of holes in the wall of said entrance tube to allow a substantial amount of the air in the air/oil mixture passing therethrough to escape prior to entering the deaerator, a series of vertically oriented elongated openings in the lowermost portion of the wall of said main cylinder, a spaced concentric outer cylinder positioned around the lower portion of said main cylinder, upper and lower rims disposed between the upper and lower edges of said outer cylinder and the wall of said main cylinder, a series of outlet holes in said rims to allow the deaerated oil to return to the tank, and a spout in the top center of said main cylinder to allow the separated air to escape.

4,053,292

GAS SCRUBBING PLANT

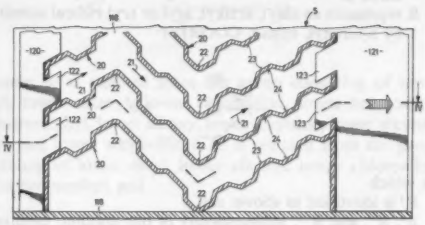
Jurg Schneider, Muttenz, and Volker Fattinger, Arlesheim, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed June 10, 1976, Ser. No. 694,754

Claims priority, application Switzerland, June 13, 1975, 7697/75

Int. Cl.² B01D *47/06*

U.S. Cl. 55—227 **21 Claims**



1. An apparatus for purification of a stream of gas, comprising a gas inlet, a gas outlet, and, therebetween, at least one scrubbing stage and at least one drop trap downstream of the said stage for separating the scrubbing liquid from the gas, the drop trap comprising an entry and an exit for the gas and a plurality of vertically spaced corrugated separator plates extending substantially parallel to one another and defining horizontal gas flow passages therebetween which extend from the entry to the exit and through which the gas is required to flow, and flow guide means disposed on the exit of the drop trap substantially outside the separator plates and extending across the latter to transmit a downwardly directed velocity component to the gas flow inside the drop trap at least near its exit.

4,053,293

COMBINATION DUST COLLECTOR AND HEAT EXCHANGER

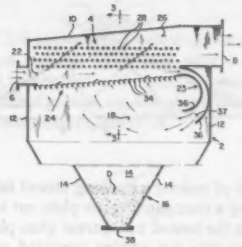
Donald R. Combs, Seattle, Wash., assignor to Bumstead Woolford Co., Woodinville, Wash.

Filed Nov. 28, 1975, Ser. No. 635,790

Int. Cl.² B01D *51/00*

U.S. Cl. 55—269 **4 Claims**

1. A combination dust collector and heat exchanger, comprising: means for providing a gravity separation chamber having an inlet and an outlet; means in communication with the inlet for recirculating gases through the chamber at reduced gas velocity so that particulate material entrained by the gases may be separated therefrom by gravity during passage of the gases through the chamber, and for discharging a portion of the gases through the outlet; and heat exchange means operatively associated with the chamber for exchanging heat between the gases and a fluid prior to discharge of the gases through the outlet; said means for recirculating gases including means for directing gases from the inlet along a generally horizontal course in overlying relation to the chamber and communicating with the outlet, means being interposed between the chamber and said horizontal course for causing a portion of the gases exiting the chamber to be discharged via the outlet, and for causing the remaining portion of said gases to be returned to the chamber along said horizontal course, and means in communication with said horizontal course for first reversing the direction of gas flow from the inlet, and then for



directing the gases into the chamber at reduced gas velocity; said heat exchange means being located between the outlet and said horizontal course and including a plurality of heat exchange elements spaced apart a sufficient distance to permit gas flow therebetween toward the outlet, said heat exchange elements and said means interposed between the chamber and said horizontal course extending in convergent planes along the direction of gas flow from the inlet to form a convergent inlet passage constituting said horizontal course.

4,053,294

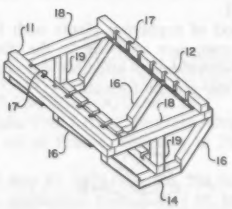
LOW STRESS SEMICONDUCTOR WAFER CARRIER AND METHOD OF MANUFACTURE

John E. Sullivan, Santa Clara, Calif., assignor to California Quartzware Corporation, Santa Clara, Calif.

Filed May 19, 1976, Ser. No. 687,672

Int. Cl.² C03B *23/20*

U.S. Cl. 65—56 **3 Claims**



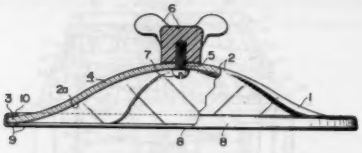
1. A method of fabricating a dimensionally stable carrier for planar semiconductor wafers during high temperature wafer processing, comprising the steps of stress relieving a raw quartz billet, cutting the quartz billet into elongate bars having rectangular cross section, welding the elongate bars in spaced parallel relation to a cross memeber therebetween at each end thereof, so that an open ended cradle is formed with two side bars and one bottom bar, cutting a plurality of inwardly facing transverse slots simultaneously in the side bars and bottom bar, whereby groups of three of the transverse slots lie in parallel planes adapted to receive the edges of the wafers for three point suspension thereof, and welding lengths of the elongate bars across the open ends of the cradle thereby reinforcing the carrier structure, whereby dimensional shift in the assembled elongate bars at high temperature due to bar internal stress relief is reduced.

4,053,295

METHOD OF MAKING A COOKING UTENSIL LID

Keinosuke Miyauchi, 12-15 Shirogane 4-Chome, Minato, Tokyo, Japan

Filed May 5, 1976, Ser. No. 683,497
Claims priority, application Japan, Sept. 8, 1975, 50-108672; Oct. 21, 1975, 50-143201; Oct. 21, 1975, 50-143202
Int. Cl.[2] C03B 27/00
U.S. Cl. 65—62 **1 Claim**



1. A method of making a cooking utensil lid comprising the steps of heating a transparent glass plate cut to have a desired shape, forming the heated transparent glass plate to a lid body having an engaging rim portion provided around the outer circumference of a see-through portion of the lid body, cooling the whole of the lid body by the blast of cool air to a room temperature to render the whole of the lid tempered, and fitting a reinforcing metal ring member integrally onto and around the engaging rim portion to thereby surroundingly embrace said rim portion by covering the the upper and the lower surfaces as well as the end of the engaging rim portion and to form buffer air spaces between the upper surface of the engaging portion and the reinforcing metal ring member and between the lower surface of the engaging portion and the reinforcing metal ring member, respectively.

4,053,296

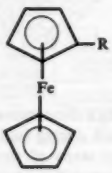
FERROCENE DERIVATIVE FOR SUPPLYING PLANTS WITH IRON

Volker Mues, Wuppertal, and Johannes Niggemann, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

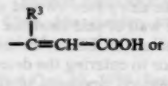
Filed Sept. 9, 1976, Ser. No. 721,736
Claims priority, application Germany, Oct. 2, 1975, 2543999
Int. Cl.[2] C05D 9/02; C05F 11/10
U.S. Cl. 71—1 **18 Claims**

1. A method of supplying plants with the micro-nutrient iron, which comprises applying to the plants or to a plant habitat plant-nutritionally effective amounts of a ferrocene derivative of the general formula

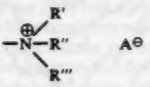
(I)



in which
R represent the group $COOR^1$,
in which
R^1 is hydrogen, alkyl, one equivalent of an alkali metal, alkaline earth metal or heavy metal cation, or an ammonium cation in which one or more hydrogen atoms can be replaced by alkyl, or
R represent the group COR^2,
in which
R^2 is alkyl, substituted alkyl, alkenyl, substituted alkenyl, cycloalkyl, substituted cycloalkyl, cycloalkenyl, substituted cycloalkenyl phenyl or substituted phenyl, or



in which
R^3 is hydrogen or alkyl, and
R^4 is a ureido or thioureido radical, a radical of the formula $-CH_2-CH_2-N=CH$-ferrocene, a 5-membered or 6-membered heterocyclic radical or a group of the formula $-OR^5$ or $-NH-R^6$,
in which
R^5 is hydrogen, alkyl, one equivalent of an alkali metal or alkaline earth metal cation, or an ammonium cation in which one or more hydrogen atoms can be replaced by alkyl, and
R^6 is carbocyclic aryl or 5-membered or 6-membered heterocyclic radical, or
R represents the sulphonamide group or the radical $-SO_3R^7$,
in which
R^7 is hydrogen, alkyl, one equivalent of an alkali metal or alkaline earth metal cation, or an ammonium cation in which one or more hydrogen atoms can be replaced by alkyl, or
R represents an alkyl, aralkyl, aryl or aryl radical substituted by hydroxyl, cyano, $COOR^1$ or



in which
R^1 is identified as above; and
R', R'', and R''', independently of one another, each represent hydrogen or alkyl and
A⁻halide or methosulphate.

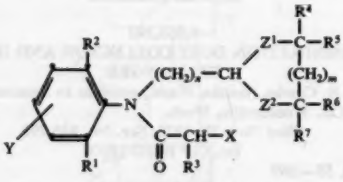
4,053,297

SELECTIVE HERBICIDAL COMPOSITIONS

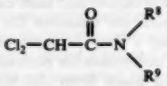
Sidney B. Richter, Chicago, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Apr. 21, 1975, Ser. No. 570,125
Int. Cl.[2] A01N 9/28, 9/12, 9/22
U.S. Cl. 71—88 **5 Claims**

1. Herbicidal compositions which reduce injury to corn from the treatment of herbicides comprising in combination an herbicide of the formula



wherein Y is hydrogen; R^1 is lower alkyl; R^2 is lower alkyl; R^3 is hydrogen; X is chlorine; *n* is 1; Z^1 and Z^2 are oxygen; R^4, R^5, R^6 and R^7 are hydrogen; and *m* is 0; and from 0.01 to 15.0 weight percentage of said herbicide of an antidote for said herbicide of the formula



wherein R^8 and R^9 are lower alkenyl.

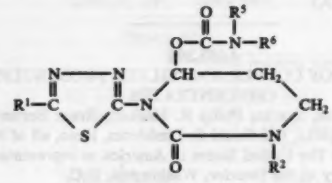
4,053,298

HERBICIDAL COMPOSITIONS CONTAINING 1-THIADIAZOLYL-6-CARBAMOYLOXYTETRAHYDROPYRIMIDINONES AND METHODS THEREFOR

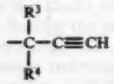
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Division of Ser. No. 507,043, Sept. 18, 1974, Pat. No. 3,951,976. This application Jan. 12, 1976, Ser. No. 648,356
The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.
Int. Cl.[2] A01N *9/12*
U.S. Cl. 71—90 2 Claims

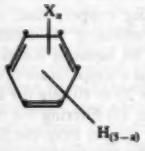
1. A herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of the formula



wherein R^1 is selected from the group consisting of lower alkyl, lower alkenyl, lower chloroalkyl, lower bromoalkyl, trifluoromethyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl and lower alkylsulfinyl; R^2 is selected from the group consisting of lower alkyl, lower alkenyl, lower chloroalkyl, lower bromoalkyl, and



wherein R^3 and R^4 are each selected from the group consisting of hydrogen and lower alkyl; R^5 is selected from the group consisting of hydrogen and lower alkyl; and R^6 is selected from the group consisting of lower alkyl, cycloalkyl of from 3 to 7 carbon atoms, and



wherein X is selected from the group consisting of lower alkyl, lower alkoxy, halogen and lower haloalkyl, and *n* is an integer from 0 to 3.

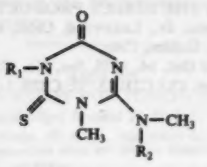
4,053,299

NOVEL THIOTRIAZINEDIONES AND THEIR USE AS HERBICIDES

John Benjamin Adams, Jr., Hockessin; Richard Lee Ellis, Wilmington, and Kang Lin, Newark, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

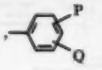
Filed Oct. 10, 1975, Ser. No. 621,401
Int. Cl.[2] C07D *251/46;* A01N *9/22. 9/12*
U.S. Cl. 71—93 12 Claims

1. A compound of the formula:



where

R_1 is alkyl of 3–6 carbons; cycloalkyl of 5–8 carbons; cycloalkyl of 5–8 carbons substituted with 1 methyl group; cyclohexyl substituted with 1 trifluoromethyl group, or with 2–4 methyl groups; cyclohexenyl; decahydronaphth-1-yl; 3-trifluoromethylphenyl; or



where

P is hydrogen, methyl, chlorine or fluorine; and

Q is hydrogen or chlorine; and

R_2 is alkyl of 1–4 carbons.

5. A method for the control of undesired vegetation comprising applying to the locus of such undesired vegetation an herbicidally effective amount of a compound of claim 1.

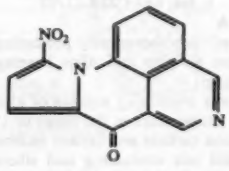
4,053,300

AGRICULTURAL COMPOSITION INCORPORATING DERIVATIVES OF 7H-INDOLIZINO (7,6,5-DE)-ISOQUINOLINE

Daniel Farge, Thiais; Yves LeGoff, Bretigny, Orge, and Gilbert Poiget, Thiais, all of France, assignors to Philagro, Lyon, France

Filed July 13, 1976, Ser. No. 704,922
Claims priority, application France, July 15, 1975, 75.22081
Int. Cl.[2] C07D *471/16;* A01N *9/22*
U.S. Cl. 71—94 10 Claims

1. A compound, of the formula:



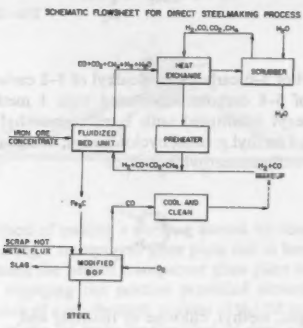
5. An agricultural bactericide, comprising a bactericidally-effective amount of 10-nitro-7-oxo-7H-indolizino (7,6,5-de) isoquinoline, an inert agricultural carrier, and a compatible surface-active agent suitable for agricultural use.

4,053,301

PROCESS FOR THE DIRECT PRODUCTION OF STEEL

Frank M. Stephens, Jr., Lakewood, Colo., assignor to Hazen Research, Inc., Golden, Colo.

Filed Oct. 14, 1975, Ser. No. 622,101
Int. Cl.[2] C21C 5/52; C22B 1/10
U.S. Cl. 75—11 53 Claims



1. A process for the direct production of steel from iron oxides which comprises:

a. converting the iron in the oxides to iron carbide; and

b. converting the iron in the iron carbide directly to steel in the basic oxygen furnace.

4,053,302

SYNTHETIC FLUORSPAR FOR CONDITIONING ELECTRIC FURNACE SLAGS

Ralph H. Nafziger, and Henry E. Blake, Jr., both of Albany, Oreg., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Continuation of Ser. No. 729,750, Oct. 5, 1976, abandoned. This application Mar. 11, 1977, Ser. No. 776,697
Int. Cl.[2] C21C 5/52
U.S. Cl. 75—11 2 Claims

1. In an electric furnace steelmaking process employing a slag conditioner to lower the viscosity of the molten slag, the improvement comprising employing as the slag conditioner a composition prepared by reacting an aqueous scrubber solution from wet-acid processing of phosphate rock, said scrubber solution containing about 1 to 10 percent of fluosilicic acid and about 0.05 to 3 percent phosphoric acid, with about 18 to 180 grams of calcium hydroxide per liter of scrubber solution at a temperature of about 50°to 90° C and a pH of about 7 to 9.

4,053,303

METHOD OF CARBOTHERMICALLY PRODUCING ALUMINUM-SILICON ALLOYS

C. Norman Cochran, Oakmont; Subodh K. Das, Natrona Heights, and Richard A. Milito, Natrona, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 6, 1976, Ser. No. 747,999
Int. Cl.[2] C22B 21/02
U.S. Cl. 75—68 A 25 Claims

1. A method of carbothermically producing an aluminum-silicon alloy from alumina and silica bearing materials, the method comprising:

a. bringing a mix containing sources of alumina, silica and carbon to a temperature in the range of 1500° to 1600° C to form silicon carbide and carbon monoxide;

b. bringing said mix containing said silicon carbide to a temperature in the range of 1600° to 1900° C to form aluminum oxycarbide and carbon monoxide;

c. bringing said silicon carbide and said aluminum oxycarbide to a temperature in the range of 1950° to 2200° C to form said aluminum-silicon alloy;

d. removing said carbon monoxide formed in step (a) without its passing through materials in steps (b) and (c); and

e. removing said carbon monoxide formed in step (b) without its passing through materials in step (c).

4,053,304

FLUX FOR REFINEMENT OF PRO-EUTECTIC SILICON CRYSTAL GRAINS IN HIGH-SILICON ALUMINUM ALLOYS

Masatoshi Tsuda, 6 Minamiichijocho, Taishogun, Kita, Kyoto, Japan

Filed Sept. 10, 1976, Ser. No. 721,970
Claims priority, application Japan, June 18, 1976, 51-70979
Int. Cl.[2] C22B 9/10; C22C 21/02
U.S. Cl. 75—257 6 Claims

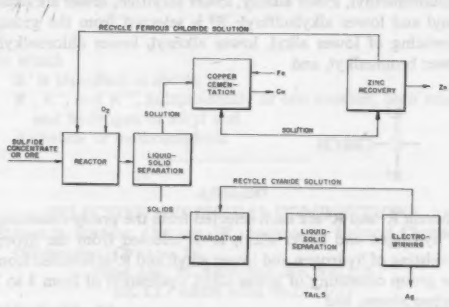
1. A grain-refining flux for high-silicon aluminum alloys, characterized in that it is made of a fused mixture consisting of, by weight, from about 95% to about 65% of sodium hexametaphosphate, $(NaPO_3)_6$, and from about 5% to about 35% of alumina, (Al_2O_3).

4,053,305

RECOVERY OF COPPER AND SILVER FROM SULFIDE CONCENTRATES

Gary A. Smyres, Sparks; Philip R. Haskett, Reno; Bernard J. Scheiner, Sparks, and Roald E. Lindstrom, Reno, all of Nev., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Oct. 15, 1976, Ser. No. 732,675
Int. Cl.[2] C22B 15/00
U.S. Cl. 75—104 1 Claim



1. A process for recovering copper and silver from complex sulfide ores or concentrates containing copper, zinc, silver, lead, arsenic, antimony and iron comprising (1) treating a slurry of the ore or concentrate in an aqueous solution of ferrous chloride with gaseous oxygen at a temperature of about 100° to 115° C and a pressure of about 20 to 80 psig for a time sufficient to solubilize copper and zinc, (2) filtering the resulting reaction mixture, (3) precipitating copper from the filtrate by addition of metallic iron, (4) treating the resulting copper-free filtrate for removal of zinc by solvent extraction and recycling the resulting ferrous chloride solution to step (1), (5) treating the residue from step (2) with an alkaline solution to sodium cyanide to solubilize the silver and, (6) electrolyzing the silver solution from step (5) to recover metallic silver.

4,053,306

TUNGSTEN CARBIDE-STEEL ALLOY

Ralph V. Rodriguez, Houston, Tex., assignor to Reed Tool Company, Houston, Tex.

Filed Feb. 27, 1976, Ser. No. 661,897
Int. Cl.[2] C22C 1/10
U.S. Cl. 75—123 J 2 Claims

1. A hard metal composition comprising 1–20 micron particles of tungsten carbide uniformly dispersed in a high tungsten

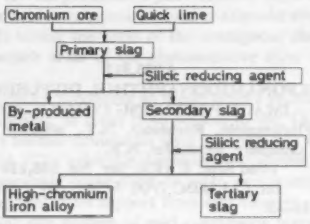
alloy steel matrix and having a uniform surface hardness in excess of Rockwell C 55, obtained by addition of pressed unsintred granules of tungsten carbide particles less than 325 mesh in size to molten steel in a ratio of 50–250 parts by weight of tungsten carbide to 100 parts by weight of steel, the high tungsten alloy steel matrix being produced by in situ decomposition of the tungsten carbide added to the molten steel.

4,053,307

PROCESS FOR MANUFACTURE OF HIGH-CHROMIUM IRON ALLOY

Tatsuo Kitayama; Fumihiko Kusama; Seigo Tonaru, and Akira Ebinuma, all of Chichibu, Japan, assignors to Showa Denko K. K., Tokyo, Japan

Filed Jan. 16, 1976, Ser. No. 649,894
Int. Cl.[2] C22C *33/04*
U.S. Cl. 75—130.5 **3 Claims**



1. A process for the manufacture of a high-chromium iron alloy containing a total of not less than 90% of iron and chromium and having a Cr/Fe weight of not less than 4.0 and a silico-chromium alloy, which process comprises the steps of mixing a chromium ore containing chromium oxide and iron oxide at a Cr/Fe weight ratio of not less than 1.6 with quick lime, heating the resultant mixture to melt it and produce a primary slag, adding to the primary slag at least one silicon-containing reducing agent selected from the group consisting of metallic silicon, silicon-chromium, ferro-silico-chromium and ferro-silicon in an amount such that the silicon content thereof equals 0.2 to 0.8 times the theoretical amount required for reduction of the iron oxide and chromium oxide present in said primary slag and such that the secondary slag subsequently obtained has a Cr/Fe weight ratio greater than 5, heating the primary slag incorporating therein the added reducing agent at temperatures not less than 1,600° C to undergo reaction, allowing the primary slag which has undergone said reaction to stand at rest for thereby producing a secondary slag in the upper region and a metal phase in the lower region, separating the metal phase to obtain a by-produced metal containing from 20 to 65% by weight of chromium, adding to the secondary slag phase at least one reducing agent selected from the group consisting of metallic silicon, silicon carbide and silico-chromium having no iron content while said slag phase is maintained at temperatures of from 1,750° to 2,050° C for thereby inducing a reaction, allowing the secondary slag which has undergone said reaction to stand at rest for thereby producing a tertiary slag phase in the upper region and an iron alloy phase containing a total of not less than 90% of iron and chromium and having a Cr/Fe weight ratio of not less than 4.0 in the lower region, separating the lower phase to obtain a high-chromium iron alloy containing a total of not less 90% of iron and chromium and having a Cr/Fe weight ratio of not less than 4.0, adding to the tertiary slag phase metallic silicon in an amount in excess of the theoretical amount required for reducing the chromium oxide and the metallic chromium present in said tertiary slag an heating the slag and the added reducing agent at temperatures exceeding 1,550° C for thereby inducing a reaction, allowing the tertiary slag which has undergone said reaction to stand at rest for thereby producing waste slag in the upper region and a silico-chromium alloy phase in the lower region, and separating the silico-chromium alloy phase to obtain silico-chromium.

4,053,308

NONPRECIOUS ALLOY FOR FUSION TO PORCELAIN

John A. Tesk, Woodridge; Ronald P. Dudek, River Grove, and Peter Kosmos, Alsip, all of Ill., assignors to Howmedica, Inc., New York, N.Y.

Filed Dec. 24, 1974, Ser. No. 536,328
The portion of the term of this patent subsequent to Sept. 23, 1992, has been disclaimed.
Int. Cl.[2] C22C *19/05*
U.S. Cl. 75—171 **10 Claims**

1. A nonprecious alloy consisting essentially of the following constituents in the indicated percentages by weight:

Contituent	Proportional Range
Nickel	Balance
Chromium	10.0–22.0
Aluminum	1.0–5.0
Silicon	0.5–2.0
Manganese	0.01–0.2
Molybdenum	0.0–7.0

and one of the following Groups A or B:

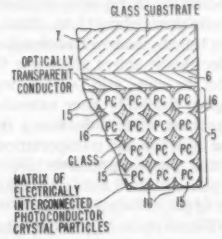
Group A	
Strontium, lanthanum and/or zirconium individually or as a combination of strontium and zirconium,	0.2–2.0
either iron or tungsten seperately or in combination	0.0–5.0
Group B	
Strontium, lanthanum and/or zirconium individually or as a combination of strontium and zirconium,	0.0–2.0
gallium,	1.0–3.0
iron	0.0–1.0.

4,053,309

ELECTROPHOTOGRAPHIC IMAGING METHOD

Guy A. Marlor, Los Altos, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 477,568, June 10, 1974, abandoned, which is a division of Ser. No. 272,241, July 17, 1972, which is a continuation of Ser. No. 149,821, June 3, 1971, which is a continuation of Ser. No. 721,331, April 15, 1968, abandoned.
This application Jan. 12, 1976, Ser. No. 648,449
Int. Cl.[2] G03G *5/12, 5/04;* H01L *31/08*
U.S. Cl. 96—1 TE **8 Claims**



1. In a repetitive imaging method for reproducing on the charge-retentive surface of a recording medium a charge pattern reproduction of an image to be copied, the method comprising the steps of:

providing a reusable electrophotographic plate comprising a

photoconductive layer including inorganic glass binder and inorganic photoconductive particles formed over a conductive substrate, the glass binder in the photoconductive layer comprising between 10% and 45% by weight of the photoconductive layer exclusive of the glass binder;

placing the charge-retentive surface closely adjacent to the photoconductive layer; and

exposing the electrophotographic plate to the image to be copied with a d.c. voltage applied across the plate and recording medium to cause a brief and relatively transient flow of electrons within the plate and to form an electrostatic charge image on the charge-retentive surface conforming in configuration to the image being copied, said charge image being developable into a visible image.

4,053,310
DURABLE CARRIER COATING COMPOSITIONS COMPRISING POLYSULFONE

Lieng-Huang Lee, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 30, 1976, Ser. No. 653,792
Int. Cl.² G03G *13/08, 9/10*; B32B *15/08, 27/14*
U.S. Cl. 96—1 SD **24 Claims**

17. An electrostatographic imaging process comprising the steps of providing an electrostatographic imaging member having a recording surface, forming an electrostatic latent image on said recording surface, and contacting said electrostatic latent image with a developer mixture comprising finely-divided toner particles electrostatically clinging to the surface of carrier particles having an average diameter from between about 1 micron and about 1,000 microns, said carrier particles comprising a core having an outer coating, said outer coating comprising a polysulfone, whereby at least a portion of said finely-divided toner particles are attracted to and deposited on said recording surface in conformance with said electrostatic latent image.

4,053,311
POLY-N-VINYLCARBAZOLE IMAGE TRANSPORT LAYER PLASTICIZED BY BIS(4-DIETHYLAMINO-2-METHYLPHENYL)-PHENYLMETHANE

William W. Limburg, Penfield; John F. Yanus, Webster, and Damodar M. Pai, Fairport, all of N.Y.

Filed Apr. 2, 1976, Ser. No. 673,236
Int. Cl.² G03G *5/04, 5/06, 5/08*
U.S. Cl. 96—1 PC **18 Claims**

13. A method of imaging which comprises:

a. providing a flexible recyclable xerographic imaging member consisting essentially of a photoconductive layer of photoconductive material dispersed in a resinous binder and a contiguous layer of electrically active material consisting essentially of poly(N-vinylcarbazole) having dispersed therein from about 1 to about 25 percent by weight of bis(4-diethylamino-2-methylphenyl)phenylmethane as an electrically active plasticizer for said poly(N-vinylcarbazole), to cause said poly(N-vinylcarbazole) to retain its original flexibility after extensive cycling in a xerographic process while maintaining the capability of supporting the injection and transportation of photogenerated holes, said photoconductive layer exhibiting the capability of photo-excited hole generation and injection and said layer of poly(N-vinylcarbazole) containing bis(4-diethylamino-2-methylphenyl)phenylmethane being substantially non-absorbing in the spectral region at which the photoconductive layer generates and injects photogenerated holes but being capable of supporting the injection of photo-generated holes from said photoconductive layers and transporting said holes through said layer of poly(N-inylcarbazole) containing bis(4-diethylamino-2-methylphenyl)phenylmethane;

a. uniformaly electrostatically charging said member; followed by

c. imagewise exposing said charged member to a source of activating radiation to which the photoconductive material dispersed in a resinous binder is absorbing and to which the layer of electrically active material is non-absorbing, whereby the photo-generated holes generated by said photoconductive material dispersed in a binder are injected into and are transported through said layer of poly(N-vinylcarbazole) containing bis(4-diethylamino-2-methylphenyl)phenylmethane to form a latent electrostatic image on the surface of said member.

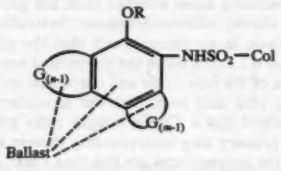
4,053,312
O-SULFONAMIDONAPHTHOL DIFFUSIBLE DYE IMAGE PROVIDING COMPOUNDS

Lee J. Fleckenstein, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 4, 1974, Ser. No. 503,128
Int. Cl.² G03C *7/00, 5/54, 1/40, 1/76*
U.S. Cl. 96—3 **21 Claims**

17. A process for producing a photographic transfer image in color comprising:

A. imagewise-exposing a photographic element comprising a support having thereon at least one photosensitive silver halide emulsion layer having associated therewith a non-diffusible sulfonamidonaphthol compound which is alkali-cleavable upon oxidation to release a diffusible color-providing moiety from the benzene nucleus, said compound having the formula:



wherein:

a. Col is a dye or dye precursor moiety;

b. Ballast is an organic ballasting radical of such molecular size and configuration as to render said compound nondiffusible during development in an alkaline processing composition;

c. R is hydrogen or an alkali labile group;

d. G represents an aromatic ring directly fused to the benzene nucleus to form a naphthalene nucleus; and

e. *n* and *m* are dissimilar positive integers of 1 to 2;

B. treating said element with an alkaline processing composition in the presence of a silver halide developing agent to effect development of each of said exposed silver halide emulsion layers, thereby oxidizing said developing agent;

C. said oxidized developing agent thereby cross-oxidizing said sulfonamidonaphthol compound;

D. said sulfonamidonaphthol compound then cleaving, thus forming an imagewise distribution of diffusible dye or dye precursor as a function of said imagewise exposure of each of said silver halide emulsion layers; and

E. at least a portion of said imagewise distributions of diffusible dye or dye precursor diffusing to a dye image-receiving layer to provide an image.

4,053,313

PROCESS FOR IMAGE REPRODUCTION USING MULTILAYER PHOTOSENSITIVE SOLVENT PROCESSABLE ELEMENTS

Roxy N. Fan, East Brunswick, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 583,454, June 3, 1975, abandoned. This application May 13, 1976, Ser. No. 685,990
Int. Cl.² G03C 5/00
U.S. Cl. 96—36 15 Claims

1. An image reproduction process comprising: (1) exposing imagewise to actinic radiation a photosensitive element comprised of, in order, (A) a solvent-processable photosensitive layer, (B) a nonphotasenitine tonable contiguous layer comprised of an elastomeric material, and (C) a sheet support, either the exposed or unexposed areas of said solvent-processable photosensitive layer being solvent-soluble after said imagewise exposure, (2) washing out either exposed or unexposed areas of said solvent-processable photosenstive layer while the other areas of said layer remain on said contiguous elastomeric layer, and (3) toning the areas of the contiguous elastomeric layer from which areas of the photosensitive layer were removed.

12. A process for producing an image from a photosensitive element comprising, in order from bottom to top, (A) a sheet support, (B) a tonable contiguous layer comprised of an elastomeric material, (C) a solvent-processable photosensitive layer, and (D) a removable cover sheet or layer, comprising:

1. removing said sheet support from said element,
2. laminating the surface of said contiguous layer of said element to a substrate, in either order,
3. exposing said laminated photosensitive element imagewise to actinic radiation, either the exposed or unexposed areas of said solvent-processable photosensitive layer being solvent-soluble and
4. removing said cover sheet, then
5. washing out either exposed or unexposed areas of said solvent-processable photosensitive layer while the other areas of said layer remain on said contiguous elastomeric layer, and
6. toning the areas of the contiguous elastomeric layer from which areas of the photosensitive layer were removed.

4,053,314

AMINE DEVELOPER LIQUID FOR DIAZOTYPE REPRODUCTION

Masanori Kimura, Funabashi, and Koji Irino, Kamakura, both of Japan, assignors to Kabushiki Kaisha Bunshodo, Tokyo, Japan

Filed Aug. 4, 1975, Ser. No. 601,539
Claims priority, application Japan, Aug. 9, 1974, 49-90713
Int. Cl.² G03C 5/34
U.S. Cl. 96—49 2 Claims

1. A developer liquid for use in a development system using developer liquid applicator roller means wherein the liquid is supplied from said roller means to an exposed diazotype paper at a rate of not higher than 3 g/m², said developer liquid consisting essentially of a mixture containing, one or more organic amines in a quantity adequate to develop an azo dye image in said diazotype paper, a diluent, and an additive of 0.01 to 1% by weight of a fluorocarbon non-ionic surface active agent based on the total weight of the mixture; said fluorocarbon non-ionic surface active agent being a compound selected from the group consisting of straight chain alkyl fluorocarbons, branched chain alkyl fluorocarbons, perfluoroalkyl fluorocarbons, and perfluorocyclic fluorocarbons.

4,053,315

PHOTODEVELOPABLE SILVER HALIDE MATERIAL

Hendrik Alfons Borginon, Mortsel, and Willy Joseph Vanassche, Kontich, both of Belgium, assignors to AGFA-GEVAERT, N.V., Mortsel, Belgium

Filed Aug. 8, 1974, Ser. No. 495,815
Claims priority, application United Kingdom, Sept. 17, 1973, 43540/73
Int. Cl.² G03C 5/24, 1/84
U.S. Cl. 96—63 18 Claims

1. Photographic element comprising a support bearing a radiation-sensitive silver halide emulsion layer wherein the emulsion layer is a direct-print photodevelopable silver halide emulsion layer containing at least one spectrally sensitizing dye to provide an extra range of sensitivity in the green and/or red regions of the spectrum, and wherein at least one dye compound absorbing radiation in the inherent sensitivity range of the silver halide is or are present in the silver halide emulsion layer and/or in a superposed layer, so as to be effective for protecting a photodeveloped image, when formed in the said element, from deterioration by prolonged exposure to light.

4,053,316

PHOTOPOLYMERIZATION OF ETHYLENICALLY-UNSATURATED ORGANIC COMPOUNDS

Robert T. Lu, Wilmington, Del., assignor to ICI United States Inc., Wilmington, Del.

Division of Ser. No. 341,992, March 16, 1973, Pat. No. 3,982,942. This application Mar. 24, 1976, Ser. No. 670,027
Int. Cl.² G03C 1/68; C08F 2/46, 4/00
U.S. Cl. 96—115 P 7 Claims

1. A photopolymerizable composition comprising an ethylenically unsaturated compound and a photosensitizing composition comprising a blend of from 0.05% to 5% by weight, based on the weight of ethylenically unsaturated compound, of $Mn_2(CO)_{10}$ and from 0.1% to 5% by weight, based on the weight of ethylenically unsaturated compound, of a co-catalyst selected from the group consisting of cumene, diisopropyl benzene, alkyl mercaptans containing from 10 to 16 carbon atoms, and mixtures thereof, wherein the weight ratio of co-catalyst to $Mn_2(CO)_{10}$ is from 0.2 to 10.

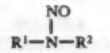
4,053,317

LIGHT-SENSITIVE COMPOSITION

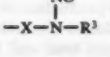
Kiyomi Naka, and Michisuke Oe, both of Hino, Japan, assignors to Teijin Limited, Osaka, Japan

Continuation of Ser. No. 494,187, Aug. 2, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 649,965
Claims priority, application Japan, Aug. 7, 1973, 48-87983
Int. Cl.² G03C 1/68; C25C 1/14
U.S. Cl. 96—115 P 10 Claims

1. A light-sensitive composition consisting essentially of
1. an N-nitroso compound present in from 0.001 to 5 parts by weight per 100 parts by weight of the composition, and having the general formula



wherein R^1 and R^2, which may be the same or different, are each a member selected from the group consisting of a monovalent hydrocarbon radical, a monovalent hydrocarbon radical attached to the nitrogen atom of amine through $-SO_2-$, and a group of the formula



where X is a divalent hydrocarbon radical, and R^3 is a monova-

lent hydrocarbon radical, which may be the same as R^1 or different therefrom, and R^1 and R^2 may together form, directly or by being bonded through an oxygen atom or nitrogen atom, a ring;

2. a photopolymerization initiator; and
3. a photopolymerizable compound having a photopolymerizable ethylenic double bond in its molecule.

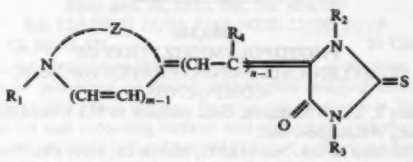
4,053,318

SILVER HALIDE PHOTOGRAPHIC EMULSIONS

Akira Sato; Akira Ogawa; Masanao Hinata, and Haruo Takei, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 18, 1975, Ser. No. 642,207
Claims priority, application Japan, Dec. 18, 1974, 49-145176
Int. Cl.² G03C *1/10, 1/22*
U.S. Cl. 96—139 **7 Claims**

1. A silver halide photographic emulsion containing at least one spectral sensitizing dye represented by formula (I)



(I)

wherein Z is an atomic group necessary for completing a 5- or 6-membered heterocyclic ring, such atomic group consisting of at least one carbon atom and of one or more nitrogen, oxygen, sulphur or selenium atoms, R_1 is an aliphatic group, R_2 is an aliphatic group having an alkylthio group or is an aliphatic group having two alkoxy groups on the same carbon atom, R_3 is an aryl group, an alkyl group or an alkenyl group, R_4 is a hydrogen atom, an alkyl group or an aryl group, m and n is 1 or 2.

4,053,319

HYDROPHILIZING COMPOSITION FOR LITHOGRAPHIC PRINTING PLATES

Raymond R. Nadeau, Natick, and John E. Wyman, Lexington, both of Mass., assignors to Itek Corporation, Lexington, Mass.

Division of Ser. No. 366,953, June 4, 1973, Pat. No. 3,970,455. This application Aug. 7, 1975, Ser. No. 602,863
Int. Cl.² C09K *3/00, 11/34, 11/42*
U.S. Cl. 106—2 **16 Claims**

1. An acidic, aqueous, printing solution comprising a reaction product of (1) phosphoric acid or one of the anions derived from such acid, (2) an organic alkylene diamine having 2–6 carbon atoms between the amine groups, and (3) a hydrophilic metal cation selected from the group consisting of aluminum, titanium, zirconium and tin.

4,053,320

PRODUCTION OF REFRACTORY ARTICLES

John Peter Hugh Williamson, Chester, and Harry Augustus Morriss, Wolverhampton, both of England, assignors to Keeling & Walker Limited, Stoke-on-Trent, England

Filed June 4, 1976, Ser. No. 692,822
Claims priority, application United Kingdom, June 10, 1975, 24813/75
Int. Cl.² C04B *35/48*
U.S. Cl. 106—57 **18 Claims**

1. A process for the production of a refractory body comprising comminuting plasma dissociated zircon sand, shaping the resulting comminuted sand and firing to form a body of single mass.

4,053,321

HEAT FUSED REFRACTORY PRODUCT CONTAINING ZIRCONIA HAVING HIGH CORROSION RESISTANCE

Masataro Okumiya, Chigasaki, and Takuro Ono, Yokohama, both of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed Aug. 30, 1976, Ser. No. 718,575
Claims priority, application Japan, Sept. 30, 1975, 50-117160
Int. Cl.² C04B *35/48*
U.S. Cl. 106—57 **9 Claims**

1. A heat fused refractory product which comprises by weight: $ZrO_2 + SnO_2$: 40–70%; $Al_2O_3 + Cr_2O_3$: 10–58%; SiO_2: 2–20%; and from 0.2–3% of an alkali metal oxide; wherein the amount of alkali metal oxide is less than that of SiO_2; the amount of SnO_2 is more than that of SiO_2; the amount of ZrO_2 is more than that of SnO_2; and the amount of Al_2O_3 is more than that of Cr_2O_3.

4,053,322

METHOD OF PREPARING PRODUCTS COMPRISING MINERAL FIBRES AND A BINDER

Kjeld Holbek, Allerslev Huse, DK-4320 Lejre, Denmark

Filed July 22, 1974, Ser. No. 490,851
Claims priority, application United Kingdom, July 26, 1973, 35626/73
Int. Cl.² C04B *7/02*
U.S. Cl. 106—99 **7 Claims**

1. A method of preparing fiber reinforced articles which consist essentially of a matrix and mineral fibers distributed in the matrix, the method comprising the steps of

heat treating a quantity of mineral fibers at a temperature of between 550° C and 900° C for a time sufficient to cause at least partial crystallization of the mineral fibers so that the surfaces thereof become uneven causing the mineral fibers to separate from each other,

intimately mixing a major amount of a matrix material and a minor amount of the heat treated mineral fibers so that the separated mineral fibers are uniformly distributed throughout the matrix material, and

causing the matrix material to set whereby the matrix material is bound securely to the individual separated heat treated mineral fibers producing articles of superior physical properties.

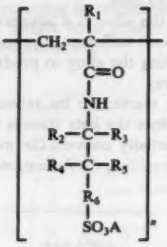
4,053,323

METHOD OF USING CEMENTING COMPOSITION HAVING IMPROVED FLOW PROPERTIES

Sally Lee Adams, Pittsburgh, Pa.; Michael M. Cook, Boxford, Mass., and Fred David Martin, McMurray, Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 742,734, Nov. 11, 1976, which is a continuation-in-part of Ser. No. 610,197, Sept. 4, 1975, abandoned, which is a division of Ser. No. 465,936, May 1, 1974, Pat. No. 3,936,408. This application Mar. 4, 1977, Ser. No. 774,294
Int. Cl.² C04B *7/38*
U.S. Cl. 106—100 **4 Claims**

1. In the method of wet processing cement, comprising the steps of subjecting an aqueous slurry of hydraulic cement presursor solids to flow for the purpose of mixing and transporting said slurry, followed by kiln heating of said slurry, the improvement comprising adding to said slurry, prior to subjecting said slurry to flow, from about 0.01 to about 5.0 percent by weight, based on weight of hydraulic cement on a dry basis, of a polyamidosulfonic compound having recurring units represented by the following formula:



wherein R_1 is hydrogen or methyl; R_2, R_3, R_4, and R_5 are each independently selected from the group consisting of hydrogen, phenyl, straight or branched alkyl of from one to twelve carbon atoms, and cycloalkyl of up to six carbon atoms; R_6 is straight or branched alkyl of one to twelve carbon atoms, cycloalkyl of up to six carbon atoms, phenyl, or is absent; A is hydrogen, alkali metal ion or ammonium; and *n* is an integer of from 2 to about 100, such that the weight average molecular weight of the polyamido-sulfonic compound is from about 200 to about 10,000.

4,053,324

PRODUCTION OF REDUCED CHARGE MONTMORILLONITE PIGMENT

Walter L. Haden, Jr., Westfield, and Peter A. H. Isaac, Summit, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Edison, N.J.

Filed Sept. 22, 1976, Ser. No. 725,570
Int. Cl.² C09C *1/28*
U.S. Cl. 106—288 B **4 Claims**

1. A method for producing a coating pigment useful as a sensitizer for record material from clay material, a substantial amount of which is dioctahedral montmorillonite having its ion-exchanged sites occupied by alkali metal or alkaline earth cations, which comprises

forming said clay material into an aqueous slurry and incorporating therein a mineral acid the anion of which forms soluble salts with exchangeable cations in the clay, sufficient acid being used to exchange hydrogen ions for exchangeable cations in said clay,

separating the clay thus ion-exchanged from the aqueous phase of the slurry by means of filtration or centrifugation, washing the remaining solids, pugging the solids with a preselected amount of a lithium salt to exchange lithium ions for hydrogen ions, without washing the pugged mixture, heating it mildly to collapse the structure of the dioctahedral montmorillonite, and grinding the material after heat treatment to produce pigment-sized particles.

4,053,325

HEAT STABLE IRON OXIDES

Dennis B. Vanderheiden, Easton, Pa., assignor to Pfizer Inc., New York, N.Y.

Filed Sept. 14, 1976, Ser. No. 723,083
Int. Cl.² C09C *1/24*
U.S. Cl. 106—304 **13 Claims**

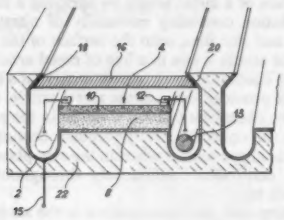
1. A coated particle comprising an iron oxide and a protective coating of insoluble metal metaphosphate wherein the coating comprises between about 1% and 20% of the total particle weight.

4,053,326

PHOTOVOLTAIC CELL

Francis Forrat, Grenoble, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed July 28, 1975, Ser. No. 599,435
Claims priority, application France, July 31, 1974, 74.26521
Int. Cl.² H01L *31/06*
U.S. Cl. 136—89 CC **5 Claims**



1. A photovoltaic cell comprising a steel plate having a textured structure coated with tin and a crystalline layer of a semiconductive material deposited thereon with the semiconductive material being doped to form a p-n junction, said photovoltaic cell being produced by decomposing a gaseous compound containing a material which forms the semiconductive crystalline layer in a chamber containing said steel plate having a textured surface coated with the tin, wherein the temperature of the tin is raised to a temperature such that the tin is in the liquid state and forms a liquid tin substrate on which the crystalline layer forms by epitaxy, and wherein the gaseous compound is suitably doped so that the semiconductive layer has the p-n structure.

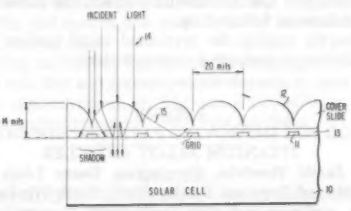
5. A photovoltaic cell comprising a steel support coated with tin and a crystalline layer of silicon deposited on said tin-coated steel support with the silicon being doped to form a p-n junction.

4,053,327

LIGHT CONCENTRATING SOLAR CELL COVER

Andrew Meulenberg, Jr., Gaithersburg, Md., assignor to Communications Satellite Corporation, Washington, D.C.

Filed Sept. 24, 1975, Ser. No. 616,468
Int. Cl.² H01L *31/06*
U.S. Cl. 136—89 CC **5 Claims**



1. In the combination of a single solar cell and a cover slide covering the surface of the solar cell which is exposed to incident light, said solar cell being of the type having a plurality of fine opaque grid lines which comprise the top electrode of said surface which is exposed to incident light, the improvement wherein said cover slide for said single solar cell consists of a plurality of converging lens means for concentrating incident light on the exposed surface areas of the solar cell between the grid lines, the repeat period of said converging lens means being equal to the distance between said grid lines.

4,053,328

ZINC PHOSPHATE COATING PROCESS

Shoji Oka, Nara; Tamotsu Sobata, Osaka; Teturo Kishimoto, Izumiotsu, and Kazuo Nobe, Kyoto, all of Japan, assignors to Nippon Paint Co., Ltd., Japan

Filed Aug. 25, 1975, Ser. No. 607,821
Claims priority, application Japan, Aug. 30, 1974, 49-100077
Int. Cl.[2] C23F *7/08*
U.S. Cl. 148—6.15 Z 14 Claims

1. In a continuous process for coating a zinc phosphate film on the surface of a metal article by spraying a zinc phosphate coating solution consisting essentially of nitrate ions, phosphate ions and zinc ions, onto the surface of the metal article, which metal article is one in a line of metal articles suspended and moving continuously or intermittently, at a station having a receptacle provided beneath the metal article, collecting the sprayed zinc phosphate coating solution in the receptable and circulating the collected zinc phosphate coating solution for spraying, the improvement wherein the zinc phosphate coating solution is controlled continuously throughout the coating process such that:

1. the phosphate ion concentration in the solution is at least 0.5% by weight;
2. nitrate ions are present in an amount such that the molar ratio of the phosphate ions to the nitrate ions in the solution is about 1:0.7 to 1:1.3;
3. the zinc ion concentration in the solution is at least 0.03% by weight;
4. the molar ratio of the zinc ions to the phosphate ions in the solution is less than 0.116:1; and
5. the pH of the solution is from 3.3 to 3.8.

4,053,329

METHOD OF IMPROVING CORROSION RESISTANCE OF METAL SUBSTRATES BY PASSIVATING WITH AN ONIUM SALT-CONTAINING MATERIAL

Nicholas T. Castellucci, Pittsburgh, and Joseph F. Bosso, Lower Burrell, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 2, 1976, Ser. No. 673,170
Int. Cl.[2] C23F *9/02, 7/10*
U.S. Cl. 148—6.15 R 18 Claims

1. A method of providing improved corrosion resistance to ferrous metal substrates, comprising:

a. passivating the surface of the substrate by pretreatment with an at least 3 percent by weight dispersion or solution in a compatible vehicle of an onium salt selected from the class consisting of:

$(R)_4N^+A^-$, $(R)_4P^+A^-$, $(R)_3S^+A^-$

where R are organic radicals and A is an anion of a weak acid which will not detrimentally attack the surface of the ferrous substrate, followed by

b. directly coating the pretreated metal surface with an adhesive or protective coating material.

4,053,330

METHOD FOR IMPROVING FATIGUE PROPERTIES OF TITANIUM ALLOY ARTICLES

Robert Jacobi Henricks, Farmington; Duane Louis Ruckle, Enfield, and Raymond Bender Slack, South Windsor, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 19, 1976, Ser. No. 678,090
Int. Cl.[2] C22F *1/18*
U.S. Cl. 148—11.5 F 3 Claims

1. A thermomechanical process to improve the fatigue properties of titanium alloys of the class which contain both alpha and beta stabilizers and contain from about 5 to about 20 volume percent of the beta phase under equilibrium conditions at room temperature, including the steps of:

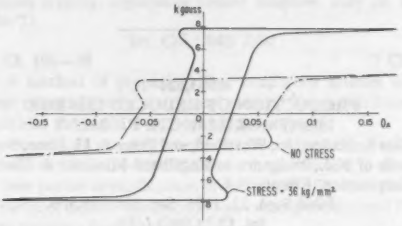
a. providing the alloy;
b. heating the alloy to a temperature above the beta transus for a period of time sufficient to produce a structure which is substantially all beta;
c. hot deforming the alloy at a temperature above the beta transus, an amount sufficient to refine the beta grain size;
d. rapidly quenching the alloy to produce an acicular martensitic structure;
e. tempering the martensite by reheating to an elevated temperature below the beta transus for a period of time sufficient to partially convert the martensite to acicular alpha, while permitting the formation of discrete equiaxed beta particles.

4,053,331

METHOD OF MAKING AMORPHOUS METALLIC ALLOYS HAVING ENHANCED MAGNETIC PROPERTIES BY USING TENSILE STRESS

Charles D. Graham, Jr., Ardmore, Pa.; Philip J. Flanders, Moorestown, N.J., and Takeshi Egami, Narberth, Pa., assignors to University of Pennsylvania, Philadelphia, Pa.

Continuation of Ser. No. 507,859, Sept. 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 495,850, Aug. 8, 1974, abandoned. This application July 29, 1976, Ser. No. 709,875
Int. Cl.[2] H01F *1/00*
U.S. Cl. 148—120 8 Claims



1. A method of providing a metal having superior magnetic properties, including low coercivity and high permeability, comprising the steps of:

a. selecting a metal from the group consisting of the substantially amorphous, noncrystalline metallic magnetic alloys having positive magnetostriction;
b. subjecting said alloy to a tensile stress less than the elastic limit of the alloy; and
c. sustaining said tensile stress, thereby producing, during said sustaining step, an amorphous alloy having superior soft magnetic properties including low coercivity and high permeability.

4,053,332

ENHANCING MAGNETIC PROPERTIES OF AMORPHOUS ALLOYS BY ROLLING

Takeshi Egami, Narberth, Pa., and Philip J. Flanders, Moorestown, N.J., assignors to University of Pennsylvania, Philadelphia, Pa.

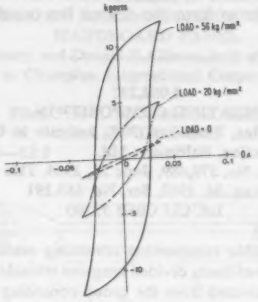
Continuation of Ser. No. 507,860, Sept. 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 495,787, Aug. 8, 1974, abandoned. This application July 29, 1976, Ser. No. 709,857
Int. Cl.[2] H01F *1/00*
U.S. Cl. 148—120 8 Claims

4. A method of providing a metal having controlled stress sensitivity of soft magnetic properties including coercivity and remanence, comprising the steps of:

a. selecting a metal from the group consisting of substantially amorphous, noncrystalline magnetic metallic alloys having positive magnetostriction;
b. subjecting said sample to a thickness reduction by rolling at a temperature less than its crystallization temperature

and maintaining its amorphous character, increasing its coercivity, and reducing its remanence;

c. subjecting said sample to a tensile stress less than the elastic limit of the alloy; and



d. sustaining said tensile stress, thereby producing, during said sustaining step, an amorphous alloy having further altered superior soft magnetic properties including increased remanence and reduced coercivity.

4,053,333

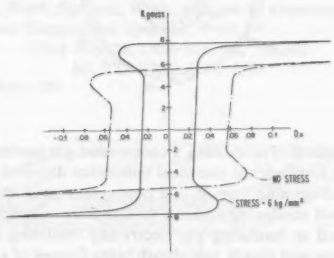
ENHANCING MAGNETIC PROPERTIES OF AMORPHOUS ALLOYS BY ANNEALING UNDER STRESS

Takeshi Egami, Narberth, Pa., and Philip J. Flanders, Moorestown, N.J., assignors to University of Pennsylvania, Philadelphia, Pa.

Continuation of Ser. No. 507,861, Sept. 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 495,786, Aug. 8, 1974, abandoned. This application July 29, 1976, Ser. No. 709,876

Int. Cl.² H01F *1/00*

U.S. Cl. 148—120 **8 Claims**



4. A method of providing a metal having superior magnetic properties, including low coercivity and high permeability, comprising the steps of:

a. selecting a metal from the group consisting of substantially amorphous, noncrystalline magnetic metallic alloys having positive magnetostriction;

b. subjecting said alloy to a tensile stress less than the elastic limit of the alloy;

c. heating said sample in a stressed condition to a predetermined temperature below the crystallization point temperature of the sample;

d. maintaining said sample in a stressed, heated state for a predetermined duration, said heating and maintaining steps constituting an annealing process;

e. cooling said sample; and

f. removing said stress after said cooling step;

g. said subjecting, heating, maintaining, cooling, and removing steps substantially increasing the remanence of said sample and substantially decreasing the coercivity of said sample while maintaining the amorphous, noncrystalline character of said sample.

4,053,334

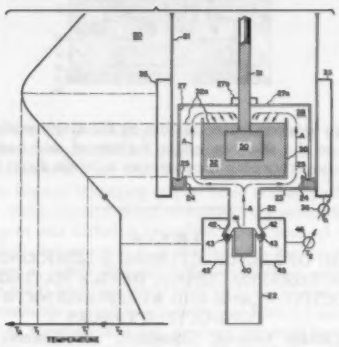
METHOD FOR INDEPENDENT CONTROL OF VOLATILE DOPANTS IN LIQUID PHASE EPITAXY

Roger S. Ehle, and Walter Garwacki, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed July 21, 1976, Ser. No. 707,274

Int. Cl.² H01L *21/208*

U.S. Cl. 148—171 **13 Claims**



1. A method for the independent control of the concentration of each of a plurality of volatile dopants in a doped layer of a semiconductor material fabricated by liquid phase epitaxy upon a semiconductor substrate, comprising the steps of:

a. providing a substantially vapor-tight volume;

b. providing a first quantity of at least one element of the semiconductor material within said volume;

c. heating said first quantity to a selected temperature sufficient to melt said first quantity;

d. saturating the molten first quantity with a desired quantity of a first volatile dopant;

e. immersing said substrate in said molten first quantity;

f. providing a source of a second volatile dopant at a position below and spatially removed from said molten first quantity;

g. independently heating said source of said second volatile dopant to cause a vapor thereof to rise without use of a carrier gas and be present at a selected partial pressure above a surface of said molten first quantity to achieve a desired concentration of said second volatile dopant within said molten first quantity at the selected temperature thereof; and

h. cooling said molten first quantity containing said substrate and said first and second volatile dopants in their respective concentrations, to fabricate a doped layer of said semiconductor material upon said substrate.

4,053,335

METHOD OF GETTERING USING BACKSIDE POLYCRYSTALLINE SILICON

Shih-Ming Hu, Hopewell Junction, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 2, 1976, Ser. No. 672,906

Int. Cl.² H01L *21/324, 29/04*

U.S. Cl. 148—174 **11 Claims**

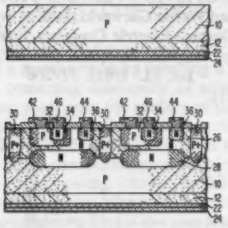
1. The method for gettering impurities and for removal of point defects from silicon semiconductor material comprising:

providing a body of monocrystalline silicon material suitable for forming semiconductor devices therein;

depositing a layer of polycrystalline silicon on one major surface of said body by hydrogen reduction of a silicon-

containing gas which is passed over said body along with a inert carrier gas while said body is maintained at a temperature between about 600° C to 800° C;

said layer being predominently oriented to one crystallographic orientation; and



forming semiconductor devices on the major surface opposite to the said one major surface of said body which involve processing temperatures between about 800° C to 1100° C.

4,053,336

METHOD OF MANUFACTURING A SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING A CONDUCTIVE PLANE AND A DIFFUSED NETWORK OF CONDUCTIVE TRACKS

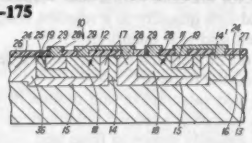
David Latham Grundy, Grasscroft, and Kenneth Lawson Hughes, Hale Barns, both of England, assignors to Ferranti Limited, Hollinwood, England

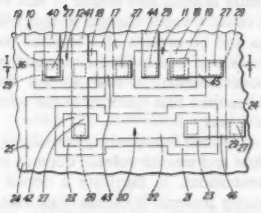
Division of Ser. No. 542,674, Jan. 21, 1975, Pat. No. 3,945,032, which is a continuation of Ser. No. 359,597, May 11, 1973, abandoned. This application Nov. 21, 1975, Ser. No. 634,277

Claims priority, application United Kingdom, May 30, 1972, 25168/72

Int. Cl.² H01L *21/20, 21/22, 21/70*

U.S. Cl. 148—175 **16 Claims**





1. A method of manufacturing a semiconductor device having a plurality of constituent components and a plurality of different possible metallisation patterns of conductors for interconnecting said components in a desired functional circuit arrangement, includes providing a semiconductor body with a substrate of one conductivity type forming a conductive plane in the device, and an epitaxial layer on the substrate of the same conductivity type, forming a plurality of diffused regions of opposite conductivity type in the epitaxial layer, a plurality of said diffused regions of opposite conductivity type and a plurality of unmodified regions of the epitaxial layer forming the constituent components of the device, simultaneously with forming said plurality of diffused regions of opposite conductivity type forming in the epitaxial layer a diffused network of conductive tracks of said opposite conductivity type remote from the conductive plane, forming at least one metallisation pattern of conductors of said plurality of different possible metallisation patterns of conductors on said epitaxial layer and connecting the conductive plane via at least one unmodified region of the epitaxial layer and to the components and the conductive tracks to form the desired functional circuit arrangement.

4,053,337

HEATING COMPOSITION

William H. Collins, Timonium, Md., assignor to Catalyst Research Corporation, Baltimore, Md.

Division of Ser. No. 378,489, June 23, 1964. This application Aug. 24, 1967, Ser. No. 665,191

Int. Cl.² C06B *33/00*

U.S. Cl. 149—37 **3 Claims**

1. A combustible composition consisting essentially of an intimate mixture of finely divided tungsten trioxide and a finely divided metal selected from the group consisting of iron, cobalt, nickel, chromium, molybdenum, aluminum, boron, magnesium, titanium, zirconium and tantalum.

4,053,338

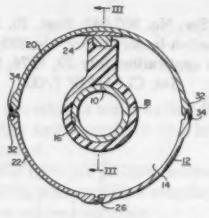
METHOD OF FABRICATING COMPRESSED GAS INSULATED CABLE

Philip C. Bolin, Northboro, Mass., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 4, 1976, Ser. No. 693,241

Int. Cl.² H01B *13/00*

U.S. Cl. 156—48 **11 Claims**



1. A method of fabricating a compressed gas insulated cable including a cylindrical electrical conductor disposed within a cylindrical opening formed in a post spacer, said spacer supporting said conductor within a substantially cylindrical outer sheath, and an insulating gas electrically insulating said conductor from said sheath, said sheath being formed of a plurality of sheath sectors each of which forms a portion of the circumference of said sheath, said method comprising:

inserting said conductor within said post spacer opening;

securing said spacer to one of said sheath sectors; and

sealingly securing said sheath sectors together to form said outer sheath.

7. A method of fabricating a multiconductor compressed gas insulated transmission line wherein a plurality of cylindrical electrical conductors are supported within a generally outer cylindrical sheath by a plurality of post spacers with an insulating gas electrically insulating said conductors from said sheath and from each other, said sheath being formed from a plurality of sheath sectors each of which forms a portion of the circumference of said sheath, each of said conductors having a spacer and a sheath sector associated therewith, said conductors being disposed within cylindrical openings formed within said post spacers, said method comprising:

inserting each of said conductors within the opening formed in said post spacer associated therewith;

securing each of said spacers to said sheath sector associated therewith; and

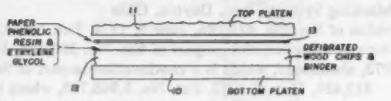
sealingly securing said sheath sectors together to form said outer sheath.

4,053,339

METHOD OF MAKING COMPOSITE PAPER HARDBOARD PANEL

Charles F. Story, and Donald B. Gibson, both of Rock Hill, S.C., assignors to Champion International Corporation, Stamford, Conn.

Filed June 5, 1975, Ser. No. 584,175
Int. Cl.[2] D21J 1/08
U.S. Cl. 156—62.2 3 Claims



1. In a method for the production of a composite, paper-overlaid panel comprising:

a. forming a mat of lignocelluose particles and a binding agent of phenolic or modified phenolic resin;

b. laying a dry sheet of paper over said mat; and

c. curing said paper-overlaid mat at a temperature between 300° F to 400° F;

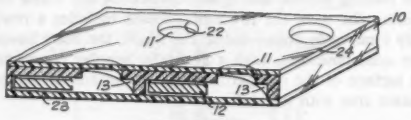
the improvement in which a solution comprising resin and polyhydric alcohol or ester thereof selected from the group consisting of ester of ethylene glycol, ester of glycerine, ethylene glycol, glycerine and polymer of ethylene glycol having a boiling point higher than that of water is applied to said mat prior to over-laying said sheet of paper.

4,053,340

METHOD FOR PRODUCING DISPLAY SIGN PANEL

Gerald L. Work, Spokane, Wash., assignor to American Sign and Indicator Corporation, Spokane, Wash.

Filed July 26, 1976, Ser. No. 708,580
Int. Cl.[2] B32B 3/24, 3/26
U.S. Cl. 156—70 5 Claims



1. A method for producing a panel for a display sign wherein the panel has a pattern of recesses each partially intersected by a light-transmitting area, and containing discs movable between bi-stable positions covering or clear of the light-transmitting areas, comprising the following steps:

deforming one surface of a planar sheet of permanently compressible material by pressing said one surface of the sheet against a mold having an exterior configuration complementary to the desired recess configuration while maintaining the remaining surface of the sheet in a planar condition to thereby reduce the sheet thickness in a pattern corresponding to the desired pattern of recesses;

forming apertures through the sheet at locations each bounded by a corresponding portion of each recess;

placing within each recess a circular disk having a diameter adequate to overlie the aperture formed therein; and

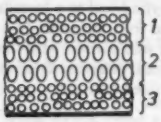
laminating said one surface of the sheet to a layer of light-transmitting sheet material.

4,053,341

LAMINATES OF POLYETHYLENE FOAM WITH AN ANISOTROPIC PORE STRUCTURE

Frank Gerald Kleiner, Cologne; Hans Radojewski, Leverkusen; Richard Mühlbauer, Leichlingen, and Karl-Heinz Müller, Quadrath-Ichendorf, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Feb. 17, 1976, Ser. No. 658,404
Claims priority, application Germany, Feb. 20, 1975, 2507274
Int. Cl.[2] B32B 5/20
U.S. Cl. 156—79 11 Claims



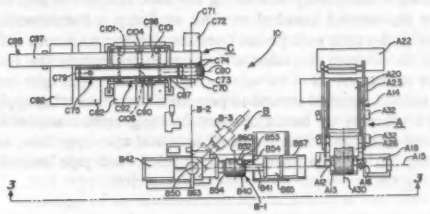
1. A process for producing a laminate comprising a plurality of crosslinked polyethylene foam layers having an anisotropic pore structure in at least one internal layer, said process comprising the steps of arranging at least three polyethylene sheets or layers which contain equal quantities of a peroxidic crosslinking agent and differing quantities of a chemical blowing agent which decomposes at a temperature higher than the temperature at which the peroxidic crosslinking agent functions, as a multi-layer structure with each of the two external layers containing a smaller proportion of blowing agent than contained in the internal layer, heating the multi-layer structure to a temperature at which each of the sheets or layers is crosslinked and at the same time welded together to form a laminate and subsequently heating the laminate at a higher temperature which causes the chemical blowing agent to decompose and foam the laminate structure.

4,053,342

TIRE BUILDING SYSTEM

Paul E. Appleby, Cuyahoga Falls; Christopher E. Christie, Akron; John H. Gerstenmaier, Akron; Thomas F. Minter, Akron, and Edwin S. Woodhall, Cuyahoga Falls, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 266,884, June 28, 1972, abandoned. This application May 17, 1976, Ser. No. 686,846
Int. Cl.[2] B29H 17/14, 17/22
U.S. Cl. 156—123 R 4 Claims



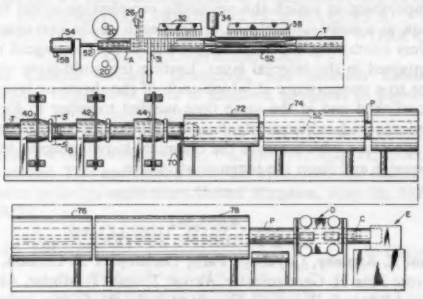
1. A method of building a tire having an axially spaced pair of inextensible beads, a cord or wire-reinforced ply extending in toroidal shape between said beads and turned about said beads, a tread, and an inextensible endless belt disposed circumferentially between said ply and said tread; the method comprising: wrapping said ply circumferentially about a rigid axially and circumferentially continuous cylinder having a first rotation axis to form a cylindrical ply band of a first diameter from 15 to 25 percent greater than said beads; while wrapping said ply to form said band, concurrently building said belt in endless form about a building surface having a second rotation axis, translating said band coaxially of said cylinder while supporting said band in cylindrical form without change of its

said first diameter and while free of any contact with its inward surface to a predetermined position; with said band in said predetermined position simultaneously expanding a central portion thereof in cylindrical form to a second diameter from one-tenth to five percent greater than said first diameter; turning radially inwardly the respective end portions of said band and securing beads therein so as to convert said band to a tire carcass in cylindrical form; then swinging said carcass about a vertical axis spaced axially away therefrom from collinear alignment with the first axis to collinear alignment with the second axis and concurrently with said swinging shaping the carcass from its cylindrical to a toroidal form; then translating said belt in endless form coaxially to a predetermined position symmetrical with said carcass, and further expanding the carcass into symmetrical coherent contact with the endless belt in its said predetermined position.

4,053,343
METHODS OF MAKING FIBER REINFORCED PLASTIC PIPE

J. Warne Carter, Wichita Falls, Tex., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 10, 1973, Ser. No. 359,065
Int. Cl.[2] B65C *3/26*; B65H *81/06*
U.S. Cl. 156—172 11 Claims



1. A method of continuously making fiber reinforced plastic pipe devoid of an inner removable liner comprising providing a first mandrel section and a second mandrel section in alignment therewith and longitudinally spaced therefrom by a gap, providing a tube of resin-absorbent material upon said first section, continuously advancing the tube across the gap and over the second mandrel section, applying a thermosetting resin to the tube as it passes over the gap in an amount sufficient to saturate the tube, at least partially curing the resin prior to the arrival of the advancing resin-saturated tube onto the second mandrel section to provide a conveyor tube, applying a plurality of bands of thermosetting resin composition coated continuous fiber elements onto said conveyor tube, and curing the resin to provide a fiber reinforced pipe assembly having the conveyor tube integral therewith.

4,053,344
PROCESS OF PRINTING ON NON-PAPER MATERIAL

Toyozi Hirahara, 615, Ooaza Osaka, Kashibacho, Katsuragigun, Nara, Japan

Filed Apr. 7, 1976, Ser. No. 674,687
Claims priority, application Japan, Apr. 10, 1975, 50-44422
Int. Cl.[2] B44C *1/14, 3/02*
U.S. Cl. 156—247 2 Claims

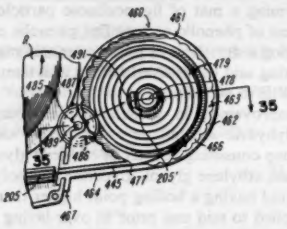
1. A process of printing a pattern on articles of non-paper materials comprising the steps of:

a. printing the pattern in ink on the article by silk screening;
b. drying said ink until tacky;
c. applying a layer of stamping foil having an adhesive layer thereon over the pattern, said adhesive layer contacting said pattern and being reactive with said ink at elevated temperatures;
d. applying a heated pressure member through a rubber layer to said stamping foil;
e. the temperature of said heated pressure member being above the temperature at which the ink reacts adhesively with the foil and below the reaction temperature of the article whereby the foil which contacts the ink becomes adhered thereto; and
f. removing the unadhered stamping foil.

4,053,345
APPARATUS FOR PRINTING AND APPLYING PRESSURE SENSITIVE LABELS

Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 476,744, June 5, 1974, Pat. No. 3,957,562, which is a continuation-in-part of Ser. No. 380,445, July 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 312,454, Dec. 6, 1972, Pat. No. 3,968,745, which is a continuation-in-part of Ser. No. 208,035, Dec. 8, 1971, abandoned. This application Feb. 17, 1976, Ser. No. 658,159
Int. Cl.[2] B32B *35/00*; B41M *1/40*
U.S. Cl. 156—384 4 Claims



1. Hand-held apparatus for printing and applying pressure sensitive labels carried on a web of supporting material, the apparatus weighing less than about three pounds and comprising a frame having a handle, a platen and a cooperable print head mounted for relative movement on the frame, a delaminator for delaminating printed labels carried on the supporting material web, an applicator for applying the printed labels, means in contact with the web downstream of the delaminator for feeding the web, an actuator disposed at the handle, means drivingly connecting the actuator with the print head and the web feeding means, and means carried by the frame for rewinding the web, the rewinding means includes a rewinder body removably connected to the frame, the body having an inlet communicating with a generally annular compartment, the surface of the compartment having means to reduce the contact area with the web.

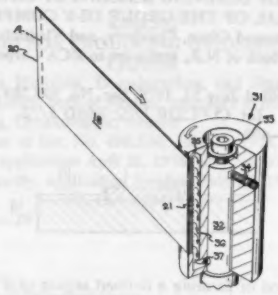
4,053,346
METHOD AND APPARATUS FOR FORMING THERMOPLASTIC CONTAINERS

Stephen W. Amberg, Toledo, Ohio, and Thomas E. Doherty, Setauket, N.Y., assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 479,421, June 14, 1974, Pat. No. 3,970,492, which is a continuation-in-part of Ser. No. 354,305, April 25, 1973, abandoned, which is a continuation-in-part of Ser. No. 211,259, Dec. 23, 1971, Pat. No. 3,854,583. This application May 6, 1976, Ser. No. 683,745
Int. Cl.[2] B65B *51/14*
U.S. Cl. 156—446 7 Claims

1. Apparatus for forming a sheet of thermoplastic material into a cylindrical sleeve comprising: a generally cylindrical shaped rotatable support having said sheet of material wrapped therearound so that one end portion overlaps an underlying end portion; vacuum means on said support for holding said underlying end portion thereagainst, a nip roller for holding

said overlapping end portion against said support such that the facing surfaces of said end portions are capable of being spaced from each other, pneumatic heating means disposed adjacent said support and having an outlet directed toward said overlapping end portion for separating the overlapping end portion from the underlying end portion to apply hot air against the



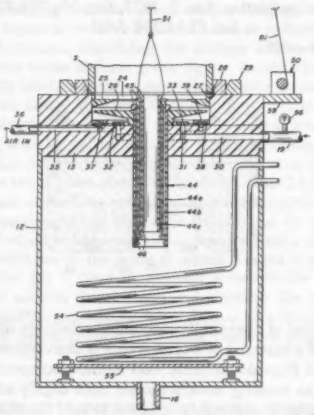
facing surfaces of said end portions, whereby said facing surfaces are softened; a reciprocable sealing bar mounted adjacent said heating means between said vacuum means and said nip roller; and means for moving said sealing bar into engagement with the overlapping end portion to compress the softened surfaces against one another and form a seam and thereby complete a sleeve.

4,053,347

METHOD FOR FORMING AN INTERNAL TAPER IN THE WALLS OF A SLEEVE-LIKE BODY

Richard C. Glenn, Hempfield Township, Westmoreland County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 8, 1973, Ser. No. 339,484
Int. Cl.[2] C23F *1/02*
U.S. Cl. 156—637 **8 Claims**



1. A method of forming an internal taper in the walls of a sleeve-like body beginning at one end of said body, said method comprising:

mounting said body in an upright stationary position with the end at which the taper is to begin at the bottom;

introducing an etching solution continuously to the interior of said body from the bottom to form a pool within the body to which pool the inside faces of the body are exposed;

agitating said pool;

continuously discharging said solution from said pool through an overflow positioned within said body;

moving said overflow vertically during the tapering operation and thus changing the level of the pool surface; and

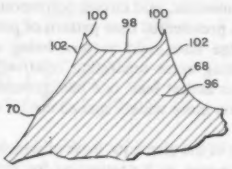
controlling the depth to which the walls are etched by control of the rate of movement of said overflow to provide maximum time of exposure to said solution at the lower end of said body and a diminishing time of exposure at each successive level thereabove.

4,053,348

DIE AND METHOD OF MAKING THE SAME

Walter Weglin, Bellevue, Wash., assignor to Jerobee Industries, Inc., Redmond, Wash.

Filed June 16, 1976, Ser. No. 696,564
Int. Cl.[2] B32B *31/00*; C23F *1/02*
U.S. Cl. 156—515 **17 Claims**



1. A method of making a precision die particularly adapted to form from a foil sheet a circuit board comprising a plurality of circuit elements corresponding within close tolerances to a preselected base pattern of pattern figures with delineating edge lines, said pattern being characterized by having separating areas separating relatively closely spaced circuit elements and at least one background area of a larger width dimension separating more widely spaced circuit elements, said die having die element adapted to engage said foil to form the circuit elements therefrom, said die elements each having a surface area with edge portions corresponding closely to the edge lines of a related pattern figure, and side walls leading from its edge portions into adjacent recesses on opposite sides of the die element, said method comprising:

a. providing a die block having a working face at which the die elements are to be formed,

b. providing a plurality of modified overlay patterns, each of which has a pattern area made up of a base area corresponding in configuration to the base pattern and having an enlarged edge portion extending beyond the delineating edge lines of the base pattern by a predetermined substantially uniform width dimension, said overlay patterns comprising a first background pattern, having an enlarged edge portion of a greater width which is less than half the width dimensions of the background area, a second separating overlay pattern having an enlarged edge portion of an intermediate width which is less than half the spacing of closely spaced circuit elements, and a third truing overlay pattern having an enlarged edge portion of a relatively small width corresponding quite closely to the base pattern,

c. covering the working face of the die block with a first protective overlay corresponding to the first background pattern to leave at least a portion of the background area of the die exposed,

d. exposing the working face of the die to an etching medium to form a recessed area at least at the background area and provide a first relief area including the area of the die block at which the circuit elements are to be formed,

e. covering the working face of the die block with a second protective overlay corresponding to the second separating overlay pattern to leave exposed a greater portion of the

background area and also expose at least a portion of separating areas of the die block,

f. again exposing the working face of the die block to an etching medium to remove further material from the background area and to also form recesses at the separating areas of the die block,

g. covering the working face of the die with a third protective overlay corresponding to the third truing pattern to protect the areas of the die at which the die elements are to be finally formed and extend moderately beyond the edge portions thereof,

h. again exposing the working face of the die to an etching medium to form the die elements to a configuration corresponding quite closely to the preselected base pattern, and

i. forming the surface areas of each of the dies with a middle recess to leave upstanding foil engaging edge portions of the die elements.

6. A die made according to the method of claim 1, said die being particularly adapted to form from a foil sheet a plurality of individual circuit elements and simultaneously bond said elements to a substrate, said circuit corresponding within close tolerances to a preselected base pattern of pattern figures with delineating edge lines, said pattern being characterized by having separating areas separating relatively closely spaced circuit elements and at least one background area of a larger width dimension more widely spaced circuit elements, said die comprising:

a. a plurality of die elements, each of which has a foil engaging surface area with upstanding foil engaging edge portions corresponding to edge lines of the circuit elements being formed,

b. some of said die elements being spaced closely adjacent to one another and having separating recesses corresponding in location to the separating areas of the base pattern, said separating recesses being of a lesser depth, an

c. said die having a background recess of a greater depth corresponding in location to the background area of said base pattern,

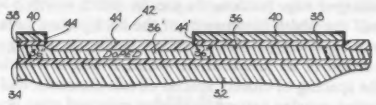
whereby when said die is pressed against said foil sheet to form a circuit board, excess foil at said recess areas is able to be located in said recess areas without becoming bonded to said substrate, and excess foil in said background area is able to become located in said background recess without becoming bonded to said substrate.

4,053,349

METHOD FOR FORMING A NARROW GAP

Richard T. Simko, Mountain View, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Feb. 2, 1976, Ser. No. 654,111
Int. Cl.² H01L *21/306*
U.S. Cl. 156—628 **14 Claims**



1. A method for forming a narrow gap in a material comprising the steps in sequence, of:

disposing a first masking layer on said material;

disposing a second masking layer on said first masking layer;

selectively removing said first and second masking layers to expose a first portion of the surface of said material;

disposing a third masking layer on at least the exposed first portion of said material, a portion of said third masking layer being in immediate contact with said first masking layer;

selectively removing after said third masking layer has been disposed said first and third masking layers to expose a second portion of the surface of said material underlying said remaining second masking layer; and

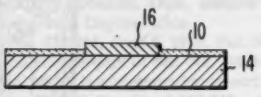
selectively removing through said exposed second portion a preselected amount of said material to form said gap.

4,053,350

METHODS OF DEFINING REGIONS OF CRYSTALLINE MATERIAL OF THE GROUP III-V COMPOUNDS

Gregory Hammond Olsen, Cranbury, and Vladimir Sinisa Ban, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed July 11, 1975, Ser. No. 595,289
Int. Cl.² C23F *1/02*; B05D *5/12*
U.S. Cl. 156—659 **8 Claims**



1. A method of forming a defined region of a group III-V crystalline material on a substrate of nucleating the growth of said material comprising the steps of:

providing a thin masking coating of carbon on a surface of the substrate except where the defined region of crystalline material is to be provided, said carbon coating being incapable of nucleating the growth of said crystalline material, and

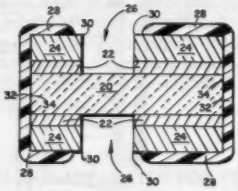
contacting the masked substrate with the crystalline material to deposit a first layer of crystalline material thereon, whereby said material is not deposited on the carbon coating but only on the surface of the substrate which is not covered by said coating.

4,053,351

CHEMICAL MACHINING OF SILICA AND GLASS

William S. DeForest, Seal Beach, and Henry V. Connelly, Jr., Corona, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 634,015, Nov. 21, 1975, abandoned.
This application Apr. 7, 1977, Ser. No. 785,376
Int. Cl.² C23F *1/02*
U.S. Cl. 156—661 **13 Claims**



1. A method of chemically machining relatively deep cuts in an object of a material of a type which is conventionally etchable by acid fluoride etchants, said method comprising:

forming an etching mask which is both highly adherent to said material and highly resistant to acid fluoride etchants by depositing, in a vacuum chamber, a relatively thin layer of a first metal immediately on a surface of said object wherein said first metal is highly adherent to said material;

selectively defining a region of said object for chemical machining by removing said etching mask from said surface in said region;

covering said etching mask with a relatively thick, relatively stress-free layer of sealing material by electrodepositing a layer of a second metal immediately on said etching mask;

then, after said step of forming said etching mask and said

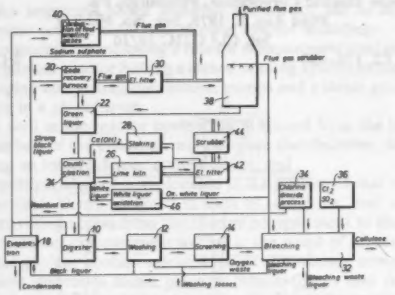
step of covering said etching mask with said layer of sealing material are completed, contacting said object in said region with acid fluoride etchant for a period of time sufficient to machine a cut in said object to a depth of at least about one mil; and

removing said etching mask and said layer of sealing material.

4,053,352
METHOD FOR PRODUCING OXIDIZED WHITE LIQUOR

Bengt Goran Hultman, Domsjoverken, and Sture Erik Olof Noreus, Husum, both of Sweden, assignors to Mo och Domsjo Aktiebolag, Ornskoldsvik, Sweden

Continuation of Ser. No. 490,530, July 22, 1974, abandoned.
This application Apr. 26, 1976, Ser. No. 679,945
Claims priority, application Sweden, July 25, 1973, 7310328
Int. Cl.[2] D21C *11/00*
U.S. Cl. 162—29 **19 Claims**



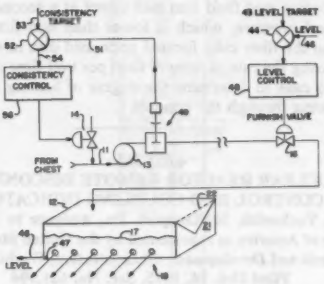
1. In the cyclic process for utilizing sodium values in sulfate cellulose pulping, in which sodium losses normally are less than sodium additions to the process, thus tending to build up a sodium surplus, and which includes the steps of pulping cellulosic material with a pulping liquor comprising sodium hydroxide and sodium sulfide, separating spent pulping black liquor containing sodium values, evaporating and combusting the black liquor to recover sodium values as sodium sulfide and sodium carbonate, dissolving the sodium sulfide and sodium carbonate in water to form green liquor, causticizing the green liquor with calcium hydroxide to form white liquor, and recycling white liquor to form pulping liquor, the improvement which comprises maintaining sodium balance at least in part by removing sodium values as white liquor, oxidizing the white liquor with a free oxygen-containing gas at a temperature within the range from about 50° to about 130° C by injecting a free oxygen-containing gas at a flow to maintain the white liquor in motion within the range from about 50 to about 500 Nm^3/hm^2 while maintaining the aqueous solution at a depth of least 2 meters above the point at which the gas is injected into the solution for a time to convert substantially all sodium sulfides to sodium thiosulfates, and utilizing the oxidized sodium thiosulfate-containing white liquor as a source of alkali outside the cyclic process for sulfate cellulose pulping.

4,053,353
METHOD OF CONTROLLING BASIS WEIGHT OF A CYLINDER BOARD MACHINE

Nils Leffler, Mountain View, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Continuation of Ser. No. 499,455, Aug. 22, 1974, abandoned.
This application Jan. 13, 1976, Ser. No. 648,655
Int. Cl.[2] D21F *1/06, 1/08*
U.S. Cl. 162—198 **4 Claims**

1. A method of controlling the basis weight of a sheet material manufactured from a variable consistency liquid stock in a machine having a sheet former and a flow box from which liquid stock is supplied to said sheet former said flow box having predetermined upper and lower limits of the level of liquid stock said method comprising: measuring said level of liquid stock in said flow box; measuring the basis weight of said sheet material and comparing said basis weight to a desired target to provide a basis weight error control signal; deriving a level target from said basis weight error control signal, comparing said measured level to said level target, and controlling said level by controlling the flow of said liquid stock to minimize any error in basis weight; measuring said consistency on

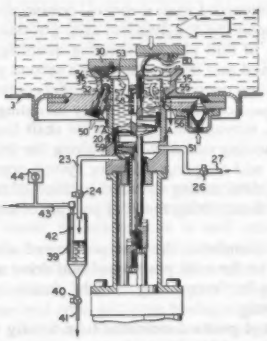


an on-line basis of said liquid stock being supplied to said flow box and controlling said consistency to a normally constant consistency target by regulation of water added to said liquid stock; comparing said derived level target to said predetermined upper and lower limits of said level; when said derived level target reaches one of said limits modifying said level target in a direction away from the limit reached, and modifying said consistency target only in response and correspondingly to said level target modification to prevent any upset in basis weight.

4,053,354
METHOD AND DEVICE FOR FORMING A FILTERING FIBER CAKE IN AN APPARATUS FOR MEASURING THE BEATING DEGREE OF PULP FLOWING THROUGH A CONDUIT

Henrik Martin Kitsnik, Segmon, Sweden, assignor to AB Kalle-Regulator, Industrivagen, Saffle, Sweden

Filed Mar. 29, 1976, Ser. No. 671,404
Claims priority, application Sweden, Apr. 10, 1975, 7504129
Int. Cl.[2] D21F *7/06;* G01N *15/00*
U.S. Cl. 162—198 **6 Claims**



1. A method utilizing a porous strainer disc for forming a fiber cake from a sample of a fibrous suspension, comprising the steps of:

withdrawing a sample of a fibrous suspension from a conduit

through which said suspension flows and introducing said suspension into a sampling vessel containing the disc so that the suspension enters on one side of the disc;

introducing a fluid into said vessel and on the same side of said disc at a first pressure greater than the pressure of said suspension flowing through said conduit as said suspension is being introduced into said vessel, said fluid being introduced into said vessel in a direction which is substantially tangential to the wall of the vessel to cause rotation of said suspension about the longitudinal axis of said vessel to form a fiber cake of even density upon said disc;

draining the fluids from the vessel;

introducing said fluid into said vessel at a second predetermined pressure, which is lower than said first pressure, upon the fiber cake formed upon said disc in said vessel;

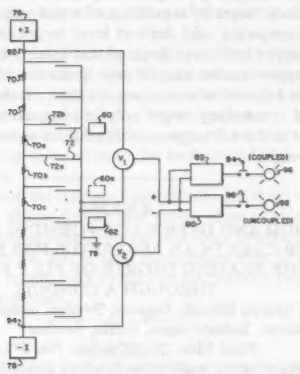
measuring the rate of flow of fluid per unit time through the fiber cake to determine the degree of beating of the pulp flowing through the conduit.

4,053,355

NUCLEAR REACTOR REMOTE DISCONNECT CONTROL ROD COUPLING INDICATOR

Michael Vuckovich, McKeesport, Pa., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 14, 1975, Ser. No. 621,994
Int. Cl.[2] G21C *17/00*
U.S. Cl. 176—19 R **10 Claims**



1. A coupling indicator system for use with remotely disengageable control rod assemblies wherein the connection of an elongated control rod to an elongated control rod drive shaft is dependent upon the longitudinal axial position of a plunger, one position of said plunger creating coupling between said control rod and said drive shaft, and a second position of said plunger creating uncoupling between said control rod and said drive shaft, said control rod assembly including a control rod drive means, movable along the drive shaft longitudinal axis, for axially moving said drive shaft along the drive shaft longitudinal axis, said coupling indicator system comprising:

means for determining the axial position of said plunger;

means for determining the axial position of said drive means; and

means for comparing the axial position of said plunger with respect to the axial position of said drive means,

said means for determining the axial position of said plunger comprising:

an elongated position indicator tube fixedly secured to and axially movable with, said plunger;

a position indicator magnet secured to said position indicator tube;

a plurality of equal resistances serially connected and having a first end point and a second end point;

a common node;

a plurality of normally non-conducting magnetically actuated switches parallelly connected between said resistances and said common node, one of said magnetically actuated switches being connected between each pair of adjacent resistances, said magnetically actuated switches being located such that at least one magnetically actuated switch is in magnetic communication with said position indicator magnet to cause such switch to conduct electric current;

a first current source having a first electrical polarity serially connected to said plurality of resistances at said first end point; and

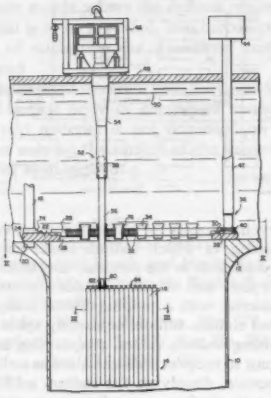
means for measuring the voltage generated between said first current source and said common node to obtain a first voltage.

4,053,356

GUIDE DEVICE

Chris M. Brammer, Jr., Houston, Tex., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 8, 1975, Ser. No. 603,077
Int. Cl.[2] G21C *19/16*
U.S. Cl. 176—30 **5 Claims**



1. A guide device for use in nuclear reactors during fuel handling operations comprising:

an open-ended nuclear reactor pressure vessel having a flange around the top periphery thereof, said pressure vessel having a nuclear core positioned therein, said nuclear core comprising:

an elongated center fuel assembly;

a plurality of similar elongated fuel assemblies said plurality of elongated fuel assemblies being positioned symmetrically about said center fuel assembly;

a member supported by said pressure vessel flange, said member having an opening therein, said opening having a horizontal size at least as large as said core size;

a rotatable support positioned in said member opening, said rotatable support being rotatably supported by said member, said support having a plurality of openings therein, said support openings being positioned in a predetermined pattern in said support so that by rotation of said rotatable support, each of said fuel assemblies except said center fuel assembly is in alignment with at least one of said support openings;

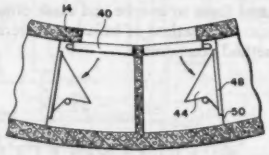
a truncated cone positioned in each of said support openings, said cones having radial extensions extending radially outwardly beyond said support openings, said truncated cones being longitudinally spaced-apart from said fuel assemblies; and

a device for rotating said rotatable support.

4,053,357
AIR BOX SHOCK ABSORBER FOR A NUCLEAR REACTOR

Ashok V. Pradhan, Beechwood, Ohio, and John A. George, Greensburg, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 3, 1975, Ser. No. 637,553
Int. Cl.[2] G21C *19/32*
U.S. Cl. 176—37 6 Claims



1. An improved shock absorber system for use in an ice condenser compartment of a nuclear reactor including:

i. a containment enclosing a reactor compartment containing a nuclear reactor having a closed cooling system including piping connecting the reactor, pumps and a steam generator in a closed loop;

ii. a wall in the reactor compartment spaced from the inner surface of the containment, the space therebetween defining an ice condenser compartment; and

iii. multiple aligned ports located in the bottom of said wall, movable doors mounted in each of said ports, said ports providing access from the reactor compartment to the ice condenser compartment so that in the event of rupture of said piping, coolant released inside the reactor compartment generates steam pressure which forces said doors under high velocity to an open position thereby providing an avenue for escape of steam into the ice condenser compartment, wherein the improvement comprises:

a separate air box shock absorber mounted inside the condenser compartment adjacent one of said ports for absorbing the energy imparted to each door by the steam pressure, said shock absorber comprising a back member slightly larger than each of said doors, a prefolded inward front member, and top and bottom members positioned such that a controlled clearance exists between said top member and said front member and between said bottom member and said front member, whereby upon impact of said door against said front member air within said shock absorber is compressed and forced out of said shock absorber through said controlled clearances such that said shock absorber absorbs the impacting forces of the door without the door rebounding to a closed position.

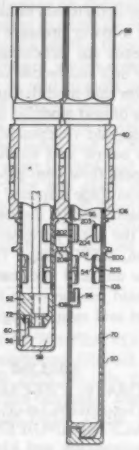
4,053,358
MODULAR ASSEMBLY FOR SUPPORTING, STRAINING, AND DIRECTING FLOW TO A CORE IN A NUCLEAR REACTOR

William E. Pennell, Greensburg, Pa., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Dec. 30, 1974, Ser. No. 537,516
Int. Cl.[2] G21C *19/28*
U.S. Cl. 176—50 9 Claims

1. In a nuclear reactor of the type wherein a liquid reactor coolant, is circulated through a reactor vessel housing a core having a plurality of assemblies and said assemblies are removably supported in a plurality of inlet modules removably supported in liners mounted to a bottom plate, said liners extending below said plate into a high pressure region and the area above said plate being a lower pressure region, the improvement comprising:

horizontal debris barriers integrally mounted about the radial periphery of each said liner below said plate, said barriers spaced closely adjacent one another to collectively form a substantially continuous horizontal boundary dividing said high pressure region into a primary high pressure zone below said boundary and a secondary high

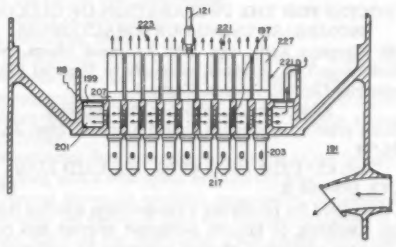


pressure zone between said boundary and said plate, and further comprising aligned primary coolant inlet openings in each said liner and module in said primary zone and aligned secondary coolant inlet openings in each said liner and module in said secondary zone.

4,053,359
NUCLEAR REACTOR

William E. Pennell, Greensburg, and William J. Rowan, Monroeville, both of Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation of Ser. No. 503,148, Sept. 4, 1974, abandoned. This application Mar. 17, 1976, Ser. No. 667,734
Int. Cl.[2] G21C *15/02*
U.S. Cl. 176—61 3 Claims



1. A liquid metal cooled nuclear reactor having a pressure vessel and also having means for supplying a cooling liquid metal to said vessel, a nuclear core in said vessel bounded below by a lower support plate and bounded radially by a core barrel, said core barrel forming an annular region between said barrel and said vessel, said annular region being at a lower temperature than said core, said core having a plurality of core assemblies for generation and control of energy of nuclear fission, a plurality of liners mounted in said lower plate, an inlet modular unit removably mounted in each said liner held by gravity, each said unit having receptacles for receiving certain of said assemblies, said assemblies being removable from their corresponding receptacles, each said modular unit being pervi-

ous to the flow of said liquid metal, said liquid metal flowing into said modular unit and into the receptacle of said modular unit and along said assemblies received in said receptacle in thermal interexchange with said assemblies and upwardly through said core, the flow of said liquid along said assemblies producing a pressure drop is said liquid so that liquid emerging from said core is at a lower pressure than liquid entering said receptacle, and means for producing low pressure regions below said modular unit and below said assemblies to produce a pressure balance on said modular unit and assemblies and to prevent the ejection of said modular unit from said liner and of said assemblies from said receptacle, said means comprising leakage flow paths below said modular unit and below said assemblies and by-pass flow vent-pipe means, said last-named means including a vent pipe disposed within said module and a plurality of flow passageways disposed horizontally through said lower plate to the outer periphery of said core barrel and said annular region, said leakage flow paths passing from below said modular unit and said assemblies to said vent-pipe and then through said passageways to the outer periphery of said core barrel and said annular region.

4,053,360

ENZYMATIC PREPARATION OF 6-D-(−)-α-AMINO-α-(P-HYDROXY-PHENYLACETAMINO)PENICILLIN ACID

Daniel Bouzard, Franconville, and Abraham Weber, Paris, both of France, assignors to Bristol-Myers Company, New York, N.Y.

Filed May 27, 1975, Ser. No. 580,991

Claims priority, application United Kingdom, June 5, 1974, 24848/74; Mar. 19, 1975, 50016/75

Int. Cl.² C12B *1/00*; C12D *1/00*

U.S. Cl. 195—29 **3 Claims**

1. A process for preparing 6-D-(−)-α-amino-α-(p-hydroxyphenylacetamido)penicillanic acid which comprises treating in aqueous solution 6-D-(−)-α-amino-α-(p-acetoxyphenylacetamido)penicillanic acid with an esterase selected from the group comprising human serum, animal serum, citrus esterase, wheat bran, wheat germ, and bacillus subtilis at a pH between about 5.0 and about 7.5 and at a concentration of about 5 to about 10 mg./ml. of esterase per total volume of the aqueous solution

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4,053,361

PROCESS FOR THE PREPARATION OF GLUCOSE ISOMERASE USING CURTOBACTERIUM

Judith Margaret Kelly, and John Laurence Meers, both of Stockton-on-Tees, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 24, 1975, Ser. No. 561,662

Claims priority, application United Kingdom, Mar. 29, 1974, 13994/74

Int. Cl.² C12D *13/10*; C07G *7/02*; C12D *13/02*

U.S. Cl. 195—66 R **7 Claims**

1. A method for producing a composition selected from the group consisting of glucose isomerase enzyme and enzyme preparations containing glucose isomerase by culturing a microorganism of the Curtobacterium genus capable of producing the composition in a medium containing a carbon source and inorganic nutrients and recovering the composition.

4,053,362

BACTERIAL ISOLATION METHOD AND DEVICE

Anthony Sforza, 804 E. 16th St. No. 6A, San Bernardino, Calif. 92404

Filed Apr. 2, 1976, Ser. No. 672,852

Int. Cl.² C12K *1/04, 1/10*

U.S. Cl. 195—103.5 R **16 Claims**

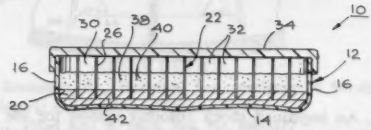
1. An improved bacterial isolation device comprising, in combination:

a bacterial test container having a closed bottom, raised sidewalls and an open top;

a layer of predetermined thickness of a bacterially non-nutritive medium covering said bottom, said medium being of an embeddable consistency; and

an isolation grid comprising a first set of spaced walls intersected by and connected to a second set of spaced walls to form a plurality of isolated test cells, said grid having all its walls embedded in said medium, whereby during use of said device swarming bacteria are prevented from passing under said grid from one said isolated area to any other of said isolated areas to overlie and mask other bacteria.

10. The improved method of isolating bacteria for test purposes, said method comprising:



disposing a layer of embeddable bacterially non-nutritive medium in a bacterial test container so as to fully cover the bottom of said container to a predetermined depth;

covering said layer of non-nutritive medium with a separate layer of desired bacterial nutritive medium;

adding bacteria to the top of the nutritive medium;

embedding the bottom of an isolation grid in said non-nutritive medium, the upper edge of said grid being above the level of said nutritive medium to define a plurality of isolated test cells; and

covering said container and incubating bacteria therein until the bacteria can be detected in said isolated test cells.

4,053,363

SPUTUM ANALYSIS METHOD

Gordon L. Dorn, Dallas, Tex., assignor to J. K. and Susie L. Wadley Research Institute and Blood Bank, Dallas, Tex.

Filed June 28, 1976, Ser. No. 700,215

Int. Cl.² C12K *1/00*; G01N *33/16*

U.S. Cl. 195—103.5 M **12 Claims**

7. In a method of detecting the presence of pathogenic organisms in the respiratory tract wherein a sputum sample is obtained and thereafter analyzed for the presence of microbial pathogens, the improvement comprising:

admixing said sputum sample with an effective mucolytic amount to degrade the viscosity of said sputum sample of a nontoxic saponin which has had microbial toxins removed therefrom which exhibit an apparent molecular weight of less than about 600 in an aqueous solution and allowing the viscosity of said sputum sample to degrade prior to the time that said sample is analyzed.

4,053,364

DRYING AND PREHEATING OF MOIST COAL AND QUENCHING OF THE FORMED COKE

Werner Poersch, Moers; Martin Wischniewski, Krefeld-Uerdingen, and Jakob Essers, Krefeld, all of Germany, assignors to Buttner-Schilde-Haas Aktiengesellschaft, Krefeld, Germany

Filed Sept. 9, 1974, Ser. No. 504,666

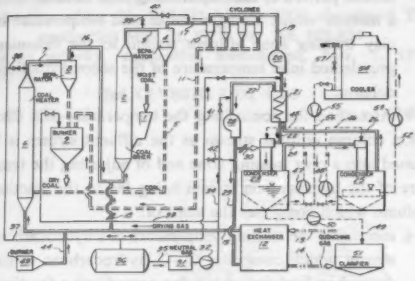
Claims priority, application Germany, Apr. 1, 1974, 2415758

Int. Cl.² C10B *39/02, 47/00*

U.S. Cl. 201—13 **19 Claims**

1. A method of treating coal and coke comprising the steps of: continuously circulating a drying gas in a closed flow circuit past a heating station, a preheating station downstream of said heating station, a drying station downstream of said preheating station, and a condensing station downstream of said drying station and upstream of said heating station; dry

quenching freshly formed coke and imparting heat therefrom to said drying gas at said heating station; directly contacting moist coal with said drying gas at said drying station to at least partially dry said coal and drive water therefrom as water vapor into said drying gas; transporting the dried coal from



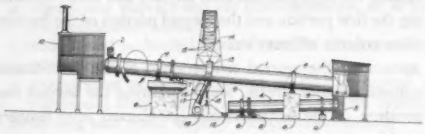
said drying station to said preheating station; directly contacting said dried coal at said preheating station with said drying gas to heat said coal; condensing the water vapor in said drying gas at said condensing station thereby removing at least some of said water vapor from said drying gas.

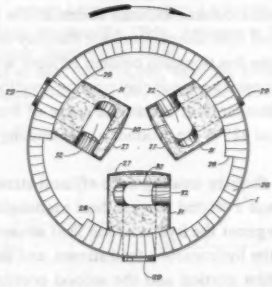
4,053,365

ROTARY CALCINER

Franklin H. Welter, Port Arthur, Tex., assignor to Great Lakes Carbon Corporation, New York, N.Y.

Filed Dec. 2, 1975, Ser. No. 637,068
Int. Cl.² C10B *49/06*
U.S. Cl. 202—100 **2 Claims**





1. In a rotary kiln suitable for calcining normally solid carbonaceous material wherein the combustion gases and solid materials to be calcined travel countercurrently in the kiln during calcination, said kiln including, at its lower discharge end, a firing crown equipped with means for admitting combustible gases or liquids and air; a feeding means for such solid carbonaceous material to be calcined adapted to the upper end of the kiln; at least one series of at least two tuyeres passing through the wall of the kiln spaced symmetrically to and at about the middle one-half of the longitudinal axis of the kiln, each tuyere terminating within the kiln through a nozzle which is located on the side of the tuyere at a sufficient height above the bed of the carbonaceous material being calcined in the kiln to permit the discharge of exterior oxidizing gases passing through the nozzle; at least one shroud which surrounds the kiln in the tuyere area and which is movably mounted with respect to the kiln wall, thereby allowing the kiln but not the shroud to rotate; said tuyeres terminating on the outside of the kiln and within the shroud; and means to cause air or other oxygen-containing gases to flow into the shroud through the tuyeres and into the kiln, the improvement which comprises:

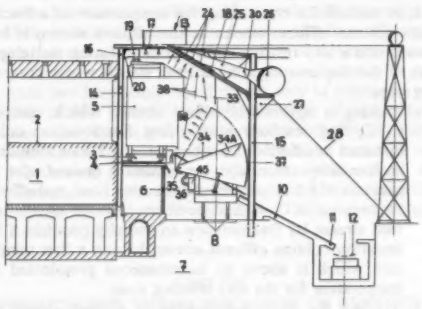
1. locating the nozzle in said tuyeres perpendicular to the radius of the kiln and pointing them at an acute angle from the longitudinal axis of the kiln in substantially the same direction toward the upper end of the kiln in order to direct the oxidizing gases toward said end and to provide a vortex flow pattern for said gases; and
2. means at the junction of each tuyere with the interior surface of the kiln lining to cause forced movement of the carbonaceous material being calcined past the tuyeres as the kiln rotates.

4,053,366

COKE-OVEN PLANTS

Heinz Holter, 39-41 Beisenstrasse, Glabeck 439, Germany

Filed Aug. 20, 1975, Ser. No. 606,171
Claims priority, application Germany, Aug. 21, 1974, 2440014
Int. Cl.² C10B *39/00, 39/04, 39/14*
U.S. Cl. 202—227 **10 Claims**



1. A coke-oven plant comprising:
i. a battery of coke-ovens;
ii. a quenching truck;
iii. a trackway along which the quenching truck travels between the coke-ovens and a quenching tower;
iv. a roof extending lengthwise of the battery from a position above the doors of the coke-ovens to a position above the trackway;
v. an extractor duct extending lengthwise of the battery and opening into a roof space beneath the roof;
vi. control means to establish progressive communication between the extractor duct and successive regions of said roof space as the quenching truck passes therebeneath; and
vii. channelling means to cause fumes emitted from the quenching truck to be directed towards the roof space,
said channeling means comprising:
a. a deflector apron extending lengthwise of the battery and downwardly from the roof towards the quenching truck trackway; and
b. a barrier device mounted on the truck, said barrier device comprising a fume deflector member extending lengthwise of the truck and being mounted for movement towards the the coke-ovens from an inoperative to an operative position, and which, when in its operative position, cooperates with the deflector apron to provide, in conjunction therewith, a barrier extending

upwardly from the outer side of the quenching truck to the roof.

4,053,367

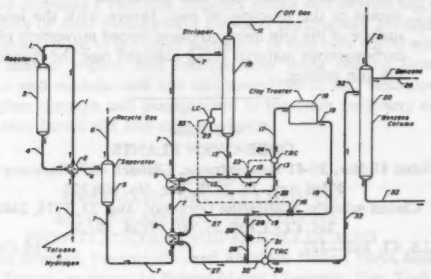
TEMPERATURE CONTROL OF INTEGRATED FRACTIONATION AND CLAYTREATING OF HYDROCARBONS

Steve A. Gewartowski, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 717,978, Aug. 26, 1976, Pat. No. 4,024,026. This application Jan. 24, 1977, Ser. No. 762,220

Int. Cl.[2] B01D 3/42; C07C 7/04, 7/12

U.S. Cl. 203—2 10 Claims



1. A method for controlling the temperature of a fractionation column effluent stream as the effluent stream is being passed into a clay treating zone and of adjusting the temperature of the clay treating zone effluent stream which comprises the steps of:

a. passing a hydrocarbon feed stream which comprises C_2–C_8 hydrocarbons into a first fractionation column operated at effective fractionation conditions including a bottom temperature above a maximum desired inlet temperature of a downstream clay treating zone, and effecting the removal of C_2–C_5 hydrocarbons from the hydrocarbon feed stream by fractionation to thereby produce a fractionation column effluent stream having a first temperature which is above an instantaneous preselected inlet temperature for the clay treating zone;

b. cooling the fractionation column effluent stream to a second temperature by dividing the fractionation column effluent stream into a first portion and a second portion, cooling the second portion by indirect heat exchange against the hydrocarbon feed stream, and then recombining the first portion and the second portion of the fractionation column effluent stream;

c. measuring the second temperature of the fractionation column effluent stream, and comparing the second temperature to the instantaneous preselected inlet temperature for the clay treating zone;

d. adjusting the relative flow rates of the first portion and the second portion of the fractionation column effluent stream in a manner which changes the second temperature of the fractionation column effluent stream to the instantaneous preselected inlet temperature for the clay treating zone;

e. passing the fractionation column effluent stream through the clay treating zone at clay treating conditions including an inlet temperature within the range of from about 210° F. to about 425° F. to produce a clay treating zone effluent stream having a first temperature;

f. cooling the clay treating zone effluent stream to a second temperature by dividing the clay treating zone effluent stream into a first portion and a second portion, cooling the second portion by indirect heat exchange against the hydrocarbon feed stream, and then recombining the first portion and the second portion of the clay treating zone effluent stream;

g. measuring the second temperature of the clay treating zone effluent stream, and comparing the second temperature to the instantaneous preselected inlet temperature of a downstream second fractionation column; and,

h. adjusting the relative flow rates of the first portion of the second portion of the clay treating zone effluent stream in a manner which changes the second temperature of the clay treating zone effluent stream to the instantaneous preselected inlet temperature of the second fractionation column.

8. A method for controlling the temperature of a fractionation column effluent stream as the effluent stream is being passed into a clay treating zone and of adjusting the temperature of the hydrocarbon stream being fed to the fractionator column which comprises the steps of:

a. measuring the existing temperature of a hydrocarbon feed stream which comprises C_2–C_8 hydrocarbons as the hydrocarbon feed stream is being passed into a fractionation column operated at effective fractionation conditions including a bottom temperature above a desired inlet temperature of a downstream clay treating zone, and effecting the removal of C_2–C_5 hydrocarbons from the hydrocarbon feed stream by fractionation to thereby produce a fractionation column effluent stream having a first temperature which is above an instantaneous preselected inlet temperature for the clay treating zone;

b. cooling the fractionation column effluent stream to a second temperature by dividing the fractionation column effluent stream into a first portion and a second portion, cooling the second portion by indirect heat exchange against the hydrocarbon feed stream, and then recombining the first portion and the second portion of the fractionation column effluent stream;

c. measuring the second temperature of the fractionation column effluent stream, and comparing the second temperature to the instantaneous preselected inlet temperature for the clay treating zone;

d. adjusting the relative flow rates of the first portion and the second portion of the fractionation column effluent stream in a manner which changes the second temperature of the fractionation column effluent stream to the instantaneous preselected inlet temperature for the clay treating zone;

e. passing the fractionation column effluent stream through the clay treating zone at clay treating conditions including an inlet temperature within the range of from about 210° F. to about 425° F. to produce a clay treating zone effluent stream;

f. dividing the clay treating zone effluent stream into a first portion and a second portion, heat exchanging the second portion against the hydrocarbon feed stream and thereby heating the hydrocarbon feed stream, and then recombining the first portion and the second portion of the clay treating zone effluent stream;

g. comparing the existing temperature of the hydrocarbon feed stream to a preselected inlet temperature for the hydrocarbon feed stream; and,

h. adjusting the relative flow rates of the first portion and the second portion of the clay treating zone effluent stream in a manner which changes the existing temperature of the hydrocarbon feed stream as determined in step (a) to the preselected inlet temperature of the hydrocarbon feed stream entering the fractionation column.

4,053,368
PROCESS FOR THE PURIFICATION OF WATER

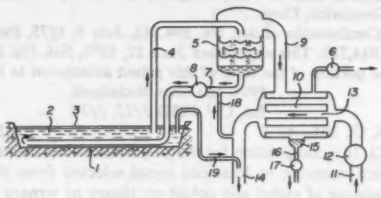
Jean-Claude F. Courvoisier; Jean-Luc Ch. Meylan, both of Geneva; Daniel M. Gross, Carouge, all of Switzerland, and Jacques Pierre D. Fournier, Sciez, France, assignors to Battelle Memorial Institute, Switzerland

Continuation of Ser. No. 520,941, Nov. 4, 1974, abandoned. This application May 21, 1976, Ser. No. 688,834

Claims priority, application Switzerland, Nov. 7, 1973, 15642/73

Int. Cl.² B01D *3/00, 3/10*

U.S. Cl. 203—10 3 Claims



1. A process for the purification of water comprising:
a. feeding water onto a solar heat absorbing surface so as to form a sheet of water thereon,
b. feeding a liquid which has a density and vapor pressure less than said water, onto said sheet, so as to form a layer of said liquid on said sheet, which functions at least to transmit solar radiation to said water,
c. preheating said water by direct solar radiation,
d. further preheating said water by reflected solar radiation and forming a still air blanket over said layer with reflection and still air blanket producing means,
e. conducting step (c) and (d) simultaneously, so as to produce preheated water,
f. feeding said preheated water from said sheet to an evaporator means,
g. evaporating at least a portion of said preheated water within said evaporator means, to form water vapor,
h. feeding said water vapor to a condenser means,
i. condensing water vapor so as to recover a purified water product therefrom.

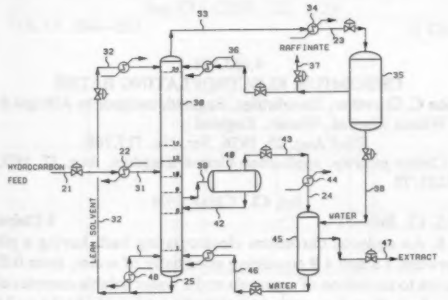
4,053,369
EXTRACTIVE DISTILLATION

Martin R. Cines, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 474,498, May 30, 1974, abandoned. This application Nov. 24, 1976, Ser. No. 744,857

Int. Cl.² B01D *3/34*

U.S. Cl. 203—52 21 Claims



1. A method of operating an extractive distillation column means at substantially maximum separation efficiencies so as to separate at least one component from a feedstock comprising an admixture of at least two organic components such that the relative volatilities of said components are sufficiently close as to substantially preclude effective separation by fractional distillation, wherein said extractive distillation column means comprises an upper extractive distillative zone and a contiguous lower stripping zone, which process comprises:
feeding said feedstock to said extractive distillative zone of said column means,
contacting said feedstock with a lean highly selective solvent in amounts sufficient to provide predetermined ratios of solvent:feedstock effective to substantially change the relative volatilities of said components under extractive distillation conditions, so as to form an overhead vaporous stream of the more volatile of said components and a bottoms stream of the less volatile of said components plus said solvent,
separating said bottoms stream into a stream of separated selective solvent and a stream of said less volatile components,
recycling said separated selective solvent to said contacting step as said lean highly selective solvent,
recycling at least a portion of said stream of less volatile components to the said stripping zone of said column means, to function as stripping vapor therein,
condensing at least a portion of said vaporous overhead as a condensed stream,
removing the remainder of said overhead as raffinate, and
returning at least a portion of said condensed stream as reflux to said extractive distillative zone of said column means in amounts sufficient to provide effective substantially optimum predetermined ratios of reflux:raffinate,
such that the said predetermined ratios of solvent:feedstock and reflux:raffinate are effective in combination to provide two immiscible liquid phases only in the upper portion of said extractive distillative zone of said column means, above the point of entry of said feedstock, and to operate said extractive distillation column means at said substantially maximum separation efficiencies, and wherein said two immiscible liquid phases represent a solvent-rich phase and a phase rich in the more volatile feedstock components.

4,053,370
PROCESS FOR THE FABRICATION OF PRINTED CIRCUITS

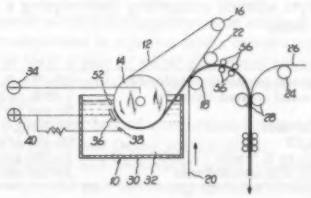
Keizo Yamashita, Shizuoka; Tatsuo Wada; Yukio Okamura, both of Shimizu, all of Japan, and William H. Safranek, Columbus, Ohio, assignors to Koito Manufacturing Company Limited, Tokyo, Japan

Filed Sept. 13, 1976, Ser. No. 722,479

Claims priority, application Japan, Sept. 18, 1975, 50-113244; Sept. 18, 1975, 50-113245

Int. Cl.² C25D *1/04, 1/20*

U.S. Cl. 204—13 8 Claims



1. A process for the fabrication of printed circuits which comprises:
a. masking a metal surface with a plating resist so as to leave exposed areas to form a circuit pattern;
b. making said metal surface cathodic in an electrolyte containing copper sulfate, with the copper concentration in

said electrolyte being in the range of from about 1 to 2 moles per liter;

c. forming a high density major layer which is about 90% to about 95% of the desired thickness of the circuit pattern by electroplating said exposed areas at a current density of between about 0.3 to about 3.0 amp/CM^2 of said metal surface with copper while said metal surface is held opposite to a first insoluble anode in said electrolyte with a predetermined spacing of about 1 to about 10 mm therebetween, said electrolyte being force-fed to flow turbulently at predetermined speed of about 1.5 to 2.5 meters per second at a temperature of about 55° C to about 70° C through the spacing between said metal surface and said first insoluble anode during formation of said major layer;

d. forming a relatively thin, roughened surface layer of from about 5% to about 10% of the desired thickness of the circuit pattern by electroplating the surface of said major layer with copper while said major layer formed on said metal surface is held opposite to a second insoluble anode in said electrolyte, said metal surface being held spaced from said second insoluble anode a distance greater than said predetermined spacing during formation of said roughened surface layer, said electrolyte being caused to flow turbulently through the spacing between said major layer on said metal surface and said second insoluble anode at speed substantially equal to said predetermined speed but slower and at a temperature substantially equal to said temperature during formation of said major surface layer; and

e. attaching the completed circuit pattern to an insulating base by bonding said roughened surface layer thereto.

4,053,371
CELLULAR METAL BY ELECTROLYSIS

Frank E. Towsley, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed June 1, 1976, Ser. No. 691,692
Int. Cl.^{2} C25D *1/08, 7/04, 5/54*
U.S. Cl. 204—20 **28 Claims**

1. A cellular metal structure comprising a continuous interconnected network of electrolytically deposited metal defining therebetween a plurality of substantially convex and substantially electrically nonconductive cellular compartments arranged in both closed and open cellular arrays such that the deposited metal interfaces the cellular compartments within the cellular metal structure.

4,053,372
TIN-LEAD ACIDIC PLATING BATH

Thomas Francis Davis, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 9, 1975, Ser. No. 620,981
Int. Cl.^{2} C25D *3/60*; C09K *3/00*
U.S. Cl. 204—43 S **7 Claims**

1. A method for depositing tin-lead alloys from an aqueous electrolyte solution comprising electrolyzing a solution comprising from

Sn metal (as stannous chloride)	7.5–75 g/l
Pb metal (as lead chloride)	1–99% of total Sn and Pb concentration
A thiourea	10–200 g/l
NH_4Cl	00–300 g/l
Na^+, or K^+ with $^-H_2PO_2 . H_2O$	10–200 g/l
HCl, 36% concentrated	20–500 ml/l

said solution being at a pH from 0.5 to 1.5, said bath being at a temperature from 130° to 200° F and depositing said lead alloy on a cathodic work piece and recovering said work piece.

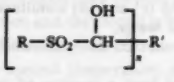
5. A storage stable solids composition for use to make the electrolyte solution used in the method of claim **1** consisting essentially of tin metal as a stannous salt, lead metal as a lead salt, ammonium chloride, a thiourea, and a hypophosphite wherein said lead on an elemental basis is from 1 to 99 percent based on the amount of total metal in said composition.

4,053,373
ELECTROPLATING OF NICKEL, COBALT, NICKEL-COBALT, NICKEL-IRON, COBALT-IRON AND NICKEL-IRON-COBALT DEPOSITS

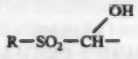
Warren H. McMullen, East Brunswick, and Thomas J. Mooney, Edison, both of N.J., assignors to M & T Chemicals Inc., Greenwich, Conn.

Continuation of Ser. No. 594,214, July 9, 1975, Pat. No. 4,014,759. This application June 17, 1976, Ser. No. 697,032
The portion of the term of this patent subsequent to Mar. 29, 1994, has been disclaimed.
Int. Cl.^{2} C25D *3/12, 3/56*
U.S. Cl. 204—43 T **22 Claims**

12. In a composition for the preparation of an electrodeposit which contains; at least one metal selected from the group consisting of nickel and cobalt or; binary or ternary alloys of the metals selected from nickel, iron, and cobalt; which comprises an aqueous acidic electroplating solution containing at least one member selected from the group consisting of nickel compounds and cobalt compounds and iron compounds providing nickel, cobalt and iron ions for electrodepositing nickel, cobalt, nickel-cobalt alloys, nickel-iron alloys, cobalt-iron alloys or nickel-iron-cobalt alloys and containing at least one additive; the improvement comprising the presence of 2×10^{-3} moles per liter to 0.1 moles per liter of an α-hydroxy sulfone having the formula:



wherein R is selected from the group consisting of alkyl, aralkyl, aryl and alkaryl; R′ is hydrogen or a mono or divalent alkyl, aralkyl, aryl, or alkaryl group, or the group



where R is as previously defined; and n is an integer 1 or 2 corresponding to the valence of R′; provided that when n is 2, R′ present or absent.

4,053,374
CHROMIUM ELECTROPLATING BATHS

John C. Crowther, Stourbridge, England, assignor to Albright & Wilson Limited, Warley, England

Filed Aug. 25, 1976, Ser. No. 717,765
Claims priority, application United Kingdom, Aug. 27, 1975, 35337/75
Int. Cl.^{2} C25D *3/06*
U.S. Cl. 204—51 **5 Claims**

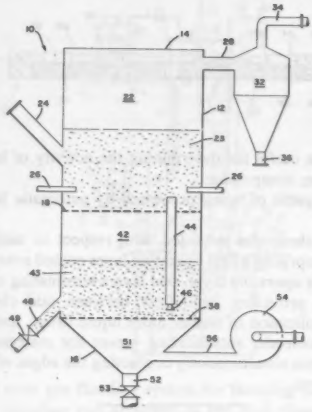
1. An aqueous chromium electroplating bath having a pH between 1.8 and 4.9 consisting essentially of water, from 0.05 moles to saturation of ammonia and a water soluble complex of trivalent chromium with (A) glycolic acid, and (B) 0.1 to 3.5 moles of a halide per mole of chromium, said chromium being present in an amount sufficient to provide 0.5 to 3 moles per liter of trivalent chromium.

4,053,375

PROCESS FOR RECOVERY OF ALUMINA-CRYOLITE WASTE IN ALUMINUM PRODUCTION

Elliott J. Roberts, Westport; Stanley Bunk, Glenville, and Peter Allen Angevine, Ridgefield, all of Conn., assignors to Dorr-Oliver Incorporated, Stamford, Conn.

Filed July 16, 1976, Ser. No. 706,028
Int. Cl.[2] C25C *3/06*
U.S. Cl. 204—67 7 Claims



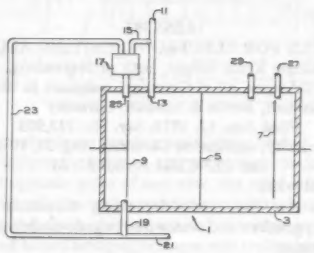
1. A process for recovering alumina-cryolite waste generated in aluminum pot lines comprising, charging the alumina-cryolite waste containing carbon and organic contaminants into a reaction bed of particulate solids maintained in the fluidized state by an upflowing stream of oxidizing gas, maintaining the temperature of said bed in the range from about 770° to 800° C to promote a combustin reaction and produce at least a small amount of a liquid phase in said bed to promote agglomeration, retaining the alumina-cryolite waste in the fluidized bed until the combustion reaction consumes the carbon and organic contaminants, the alumina-cryolite product agglomerating at temperature in the fluidized bed to pellet form, discharging the product pellets from the fluidized bed and cooling the discharged pellets.

4,053,376

ELECTROLYTIC PRODUCTION OF HYDROGEN IODIDE

William W. Carlin, Portland, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 27, 1976, Ser. No. 735,867
Int. Cl.[2] C25B *1/22, 1/24*
U.S. Cl. 204—103 12 Claims



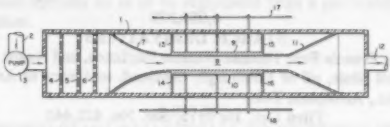
9. A method of producing hydrogen hydrogen iodide comprising passing an electrical current through an aqueous anolyte liquor to an aqueous catholyte liquor which catholyte liquor contains iodine.

4,053,377

ELECTRODEPOSITION OF COPPER

David Schlain, Greenbelt; Frank X. McCawley, Cheverly, and Gerald R. Smith, Columbia, all of Md., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Feb. 13, 1976, Ser. No. 657,894
Int. Cl.[2] C25C *1/12, 7/00;* C25D *3/38, 17/00*
U.S. Cl. 204—106 1 Claim



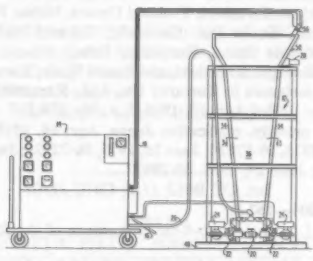
1. A method for electrorefining or electrowinning of copper comprising electrodepositing the copper from an electrolyte consisting essentially of an aqueous solution of copper sulfate and sulfuric acid under conditions comprising cathode and anode current densities of about 60 to 400 amp/sq. ft. and a substantially non-turbulent flow of electrolyte past the electrode surfaces at a rate of about 150 to 400 ft/min, said non-turbulent flow being achieved by means of a venturi section and a single cathode-anode pair.

4,053,378

WATER PURIFICATION METHOD AND APPARATUS

Karl Moeglich, Williamsville, N.Y., and Graham L. Hodgetts, Mars, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 4, 1976, Ser. No. 663,792
Int. Cl.[2] C02B *1/82;* C02C *5/12*
U.S. Cl. 204—149 11 Claims



1. A continuous method for agglomerating solids of colloidal size of larger suspended in aqueous media comprising:

providing at least a pair of metal electrodes having facing surface areas substantially closely spaced with respect to one another;

providing a fluidized bed of conductive, attrition resistant particles between said facing surface areas;

causing said media and suspended solids to continuously flow between and past the facing surfaces of said spaced electrodes and through said bed;

causing said suspended solids to agglomerate by applying an alternating (AC) voltage at a frequency between about 0.2 Hz and 800 Hz across said electrodes while controlling said AC voltage in relation to the spacing between said electrode surface areas and the conductivity of said media so as to provide an alternating electric current flowing between said electrode surfaces with the value of said

alternating current being between about 0.08 to 6.0 amperes per square inch of electrode surface; and

providing fluid-induced agitation of said liquid media so as to create turbulence therein as the same flows through said bed and between and past the spaced facing surfaces of said electrodes whereby the suspending forces of said solids will be broken so that said solids will agglomerate for removal from said media.

4,053,379

STARCH DERIVATIVES

John Francis Fox; Thomas William Roylance, and Angus Campbell Mair, all of Edinburgh, Scotland, assignors to Arbrook, Inc., Arlington, Tex.

Filed Oct. 10, 1975, Ser. No. 621,441
Claims priority, application United Kingdom, June 20, 1975, 46232/75; Oct. 25, 1974, 46232/74
Int. Cl.² B01J *1/10*
U.S. Cl. 204—160.1 15 Claims

1. A starch derivative absorbable by body tissues comprising the product of treating an etherified starch with an acid medium of pH 6 or below or with an alkaline medium of pH 8 or above and subjecting the treated material to a temperature of from about 80° to about 100° C for time sufficient to produce a product exhibiting a reducing power of at least 15 R_{Cu} units.

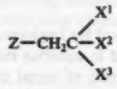
4,053,380

1,1,1-TRIHALOGENO-4-METHYLPENTENES, METHOD OF PREPARING THE SAME AND USE OF THE SAME IN THE PREPARATION OF 1,1-DIHALOGENO-4-METHYL-1,3-PENTADIENES

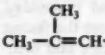
Yoshiji Fujita, Kurashiki; Yoshiaki Omura, Mitsu; Fumio Mori, Kurashiki; Kazuo Itoi, Kurashiki; Takashi Nishida, Kurashiki; Yoshin Tamai, Kurashiki; Sukeji Aihara, Kurashiki; Takeo Hosogai, Kurashiki, and Fumio Wada, Kurashiki, all of Japan, assignors to Kurraray Co., Ltd., Kurashiki, Japan

Filed Apr. 13, 1976, Ser. No. 676,517
Claims priority, application Japan, Apr. 14, 1975, 50-45068; May 12, 1975, 50-57124; June 16, 1975, 50-72923; June 25, 1975, 50-79561; June 27, 1975, 50-79802
Int. Cl.² B01J *1/10*; C07C *21/02*
U.S. Cl. 204—163 R 41 Claims

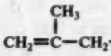
1. A 1,1,1-trihalogeno-4-methylpentene of the formula



wherein X^1, X^2 and X^3 are the same or different and each represents a halogen atom and Z is a group of the formula



or a group of the formula

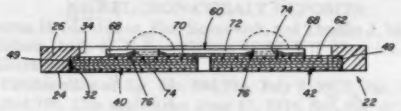


4,053,381

DEVICE FOR DETERMINING IONIC ACTIVITY OF COMPONENTS OF LIQUID DROPS

David Philip Hamblen, Rochester; Clyde Pershing Glover, Pittsford, and Sang Hyung Kim, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 19, 1976, Ser. No. 687,725
Int. Cl.² G01N *27/46, 27/58*
U.S. Cl. 204—195 M 33 Claims



1. A device useful for determining the activity of ions in a liquid solution, comprising:

a frame capable of being processed by automatic handling devices,

two solid electrodes mounted with respect to said frame, each comprising a first operative layer coated over at least one other operative layer, said layers terminating at edges,

means for providing ionic flow between said electrodes upon application of one or more liquid drops, and

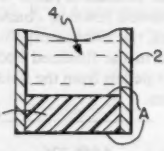
at each electrode, anti-shorting means for restraining the liquid from simultaneously contacting the edges of both of said layers.

4,053,382

LIQUID JUNCTION OF REFERENCE ELECTRODE

Hiroshi Maruyama, and Masashi Watanabe, both of Kyoto, Japan, assignors to Horiba, Ltd., Japan

Filed Feb. 6, 1976, Ser. No. 655,975
Claims priority, application Japan, Feb. 25, 1975, 5023621
Int. Cl.² G01N *27/30*
U.S. Cl. 204—195 F 5 Claims



1. In a reference electrode comprising an internal electrode, an internal liquid and a liquid junction structure for separating said internal liquid from a liquid sample to be measured, the improvement wherein said junction structure comprises polytetrafluoroethylene having a hydrophillic layer on the liquid junction surfaces thereof.

4,053,383

APPARATUS FOR ELECTRODEPOSITING ALUMINUM

Richard Dötzer; Klaus Stöger, both of Nuremberg, and Josef Stadter, Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

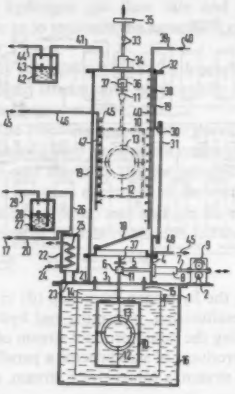
Filed Aug. 12, 1976, Ser. No. 713,983
Claims priority, application Germany, Aug. 21, 1975, 2537256
Int. Cl.² C25D *17/06, 17/18*
U.S. Cl. 204—225 12 Claims

1. Apparatus for electrodepositing aluminum from an aprotic, oxygen-free and water-free organo-aluminum electrolyte comprising:

a. an electroplating tank containing the electrolyte having means for closing it off in an airtight manner;

b. means to supply an inert gas to said tank;

c. a contact making and holding device disposed within the electroplating tank and adapted for horizontal or rotatable movement of a work piece holder;
d. a lock chamber disposed above the electroplating tank having a closable lock opening for inserting and removing work pieces to be electroplated;
e. a closable flap coupling said tank and said chamber;



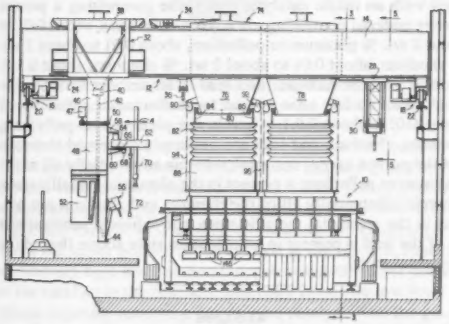
f. an inert gas flooding system for flooding said chamber;
g. a coupling rod arranged in the lock chamber and supported for vertical motion into and out of said electroplating tank for receiving a work piece holder, transferring said holder to the contact making and holding device and reinserting said work piece holder.

4,053,384

DEVICE FOR CHANGING ANODE BLOCKS, CRUST BREAKING AND CHARGING ALUMINUM FURNACES

Frederik W. Siegmund, Jekerstraat 88 P.O. Box 5018, Utrecht, Netherlands

Filed Oct. 10, 1975, Ser. No. 621,418
Int. Cl.² C22D *3/02, 3/12*
U.S. Cl. 204—244 **4 Claims**



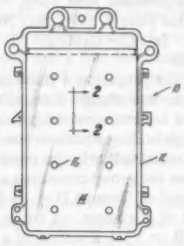
1. In an aluminum making installation having at least one row of electrolysis furnaces and supporting tracks extending along the opposite sides of said row, the combination of:
a pair of trolley means supported on said tracks and movable back and forth therealong, and a bridge structure connected to and bridging between said trolley means sequentially to pass overhead the furnaces of said row, said bridge structure having first rail means disposed along one side thereof and being provided with an elongate, vertical opening in a region between said trolley means, and second rail means along the opposite sides of said opening;
a tool-carrying trolley supported on said first rail means said tool-carrying trolley including a support including upper and lower sections, an operator's cab carried by said lower section, and anode changing means carried by said lower section in full view of said operator's cab, and means for rotating said lower section relative to said upper section; and
a charging hopper assembly supported on said second rail means and including at least one hopper projecting downwardly through said opening and movable back and forth lengthwise of said bridge structure within the confines of said opening so as to be registrable with a particular furnace.

4,053,385

BONDING STABLE MATERIALS TO RESINOUS CELL FRAMES

Stanley T. Hirozawa, Birmingham, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Oct. 30, 1975, Ser. No. 627,094
Int. Cl.² B01K *3/04*
U.S. Cl. 204—254 **9 Claims**



1. In a bipolar electrolytic filter press cell, said cell having a central frame interposed between the anode and cathode, the central frame being formed from a synthetic resin, the improvement which comprises:
an inert film bonded to the frame with a cyanoacrylate adhesive.

4,053,386

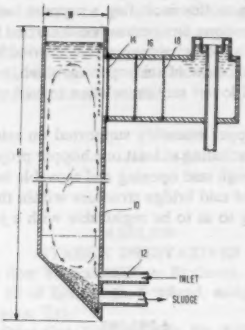
ELECTROLYTIC FILTER FOR ELECTROLYTICALLY FILTERING AND RECOVERING METALS FROM COLLOIDAL SUSPENSIONS

Ferenc J. Schmidt, Ardmore, Pa., assignor to Ametek, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 515,915, Oct. 18, 1974, Pat. No. 4,014,767. This application Aug. 4, 1975, Ser. No. 601,253
Int. Cl.² B03C *5/00*; C25C *7/00, 7/04*
U.S. Cl. 204—264 **10 Claims**

1. An electrolytic filter comprising two electrically conductive vertically disposed sheet porous members, means adapted to cause an electrolytic fluid carrying suspended solids to be separated therefrom, to pass through a first one of said conductive members from an inlet side to an outlet side thereof where the removal of solids is completed on the inlet side thereof, and then through a second one of said conductive members, and means adapted to establish an electrolytic current between said first member, as cathode, and said second member, as anode, through said electrolytic fluid flowing therebetween, said filter adapted to accomplish said removal by the formation of flocs

in the space adjacent said cathode on the inlet side thereof and to facilitate the removal and collection of said flocs by upward



fluid flow parallel to said cathode adjacent its inlet side induced at least in part by electrolytically generated gas thereat.

4,053,387

PROCESS FOR UPGRADING LUBRICATING OIL STOCK

Robert F. Bridger, Hopewell; Costandi A. Audeh, and El-Ahmadi I. Heiba, both of Princeton, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed June 8, 1976, Ser. No. 693,829

Int. Cl.² C10G *23/02, 34/00*

U.S. Cl. 208—88 **9 Claims**

1. A process for preparing a stabilized lubricating oil resistant to oxidation and sludge formation upon exposure to a highly oxidative environment which comprises a first step of contacting a high boiling hydrocarbon fraction lubricating oil stock with elemental sulfur in the presence of a catalyst material selected from the group consisting of alumina, silica, aluminosilicate, a metal of Groups II-A, II-B, VI-B or VIII of the Periodic Table of Elements, an oxide of a metal of Groups II-A, II-B, VI-B or VIII, a sulfide of a metal of Groups II-A, II-B, VI-B or VIII, clay, silica combined with an oxide of a metal of Groups II-A, III-A, IV-B or V-B. and combinations thereof in a flow reactor at a reaction temperature of from about 150° C to about 225° C, a reaction pressure of from about 0 psig to about 500 psig, a liquid hourly space velocity of from about 0.5 hr^{-1} to about 20 hr^{-1}, said elemental sulfur being added in an amount of about 0.025 to about 0.2 percent by weight of said oil stock, and a second step of contacting the product of the first step with hydrogen in the presence of alumina impregnated with at least about 10 weight percent of MoO_3 and at least about 2.5 weight percent of CoO, said impregnated alumina having at least 50 percent of its pores with a pore diameter of 50 Angstrom Units or more, at a reaction temperature of from about 80° C to about 190° C, a reaction pressure of from about 100 psig to about 300 psig and a liquid hourly space velocity of from about 0.1 hr^{-1} to about 10 hr^{-1}, said hydrogen in the second step being circulated at from about 100 scf/bbl to about 1500 scf/bbl.

4,053,388

PROCESS FOR PREPARING AROMATICS FROM NAPHTHA

Angus B. Bailey, Dallas, Tex., assignor to Moore-McCormack Energy, Inc., Dallas, Tex.

Filed Dec. 6, 1976, Ser. No. 747,863

Int. Cl.² C10G *23/00, 34/00*

U.S. Cl. 208—89 **15 Claims**

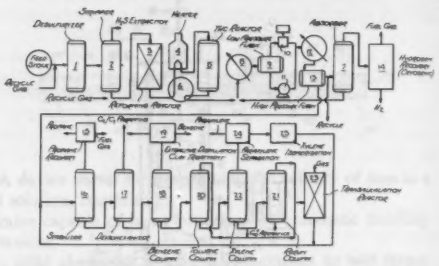
1. The process for producing aromatic compounds from naphtha which comprises the steps of

a. desulfurizing the naphtha;

b. catalytically reforming the product stream of step (a) under conditions adapted to produce a substantial amount of aromatic compounds including a reforming temperature of from about 900° to 100° F and a pressure of from about 125 to 375 psig;

c. thermally hydrocracking the product stream of step (b) at a temperature of from about 1200° to 1380° F and a pressure of from about 125 to 375 psig;

d. separating gaseous hydrogen and lighter hydrocarbons from the product stream of step (c);



e. recycling the hydrogen from step (d) to the feed streams of said desulfurizing, reforming and hydrocracking steps;

f. fractionating the liquid product stream of step (c) to withdraw as products of said process a paraffin stream, a benzene-rich stream, a toluene-rich stream, and a xylene-rich stream.

4,053,389

HYDROCARBON CONVERSION WITH AN ACIDIC MULTI-METALLIC CATALYTIC COMPOSITE

Frederick C. Wilhelm, Ann Arbor, Mich., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 479,231, June 13, 1974, Pat. No. 3,915,846, which is a continuation-in-part of Ser. No. 353,925, April 23, 1973, Pat. No. 3,839,195, which is a continuation-in-part of Ser. No. 152,467, May 28, 1971, abandoned, which is a division of Ser. No. 835,218, June 20, 1969, abandoned. This application Sept. 8, 1975, Ser. No. 611,583

Int. Cl.² B01J *23/62;* C10G *35/08*

U.S. Cl. 208—139 **16 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.01 to about 2 wt. % rhenium, about 0.1 to about 3.5 wt. % halogen, and lead in an amount sufficient to result in an atomic ratio of lead to phatinium or palladium of about 0.05:1 about 0.9:1; wherein the platinum or palladium, rhodium, rhenium, and lead are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium is present in the elemental metallic state; wherein substantially all of the rhenium and rhodium are present in the elemental metallic state; and wherein substantially all of the lead is present in an oxidation state above that of the elemental metal.

4,053,390

START-UP PROCEDURE FOR A RESIDUAL OIL PROCESSING UNIT

Lewis C. James, Ras Tanura, Saudi Arabia, assignor to Cities Service Research and Development Company, Tulsa, Okla.

Filed Dec. 17, 1975, Ser. No. 641,394

Int. Cl.² C10G *13/02, 23/10*

U.S. Cl. 208—143 **1 Claim**

1. In the start-up procedure for an upflow, ebullated bed reactor for the hydroprocessing of heavy hydrocarbon residues, involving charging the reactor with catalyst, heating the

catalyst and reactor with pre-heated hydrogen to an operating range of about 700°–900° F. and about 1000–3000 psig hydrogen partial pressure, adding a light oil and additional hydrogen, with a recycle ebullating pump assisting the hydrogen in forming an expanded, ebullated catalyst bed, with said heating and addition taking a substantial period of time, and then adding heavy hydrocarbon residue, the improvement which comprises

a. setting the hydrogen gas flow rate and the ebullating pump rate so as to maintain the expansion of the ebullated bed,

b. incrementally substituting heavy hydrocarbon residue for the light oil feed stream until substantially all the light oil is replaced by heavy residue, and

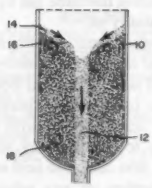
c. controlling the viscosity and specific gravity of the incrementally changing feed stream to a range of about ±10% for viscosity and about ±5% for specific gravity, thus maintaining a constant expansion of the ebullated bed, at a constant ebullating pump rate and gas flow rate throughout substitution of the heavy residue for the light oil.

4,053,391

HYDRODESULFURIZATION PROCESS EMPLOYING A GUARD CHAMBER

John Angelo Paraskos, Pittsburgh, and Stephen Joseph Yanik, Valencia, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Nov. 17, 1975, Ser. No. 632,357
Int. Cl.² C10G 23/02
U.S. Cl. 208—210 **6 Claims**



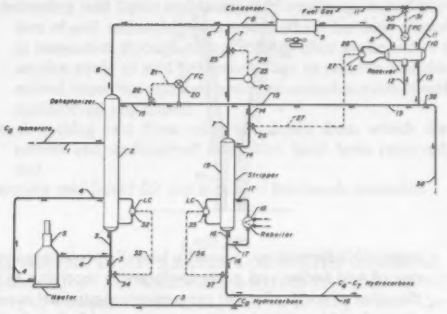
1. A process for hydrodesulfurization of a metal- and sulfur-containing residual oil comprising passing said oil and hydrogen downwardly through both a guard chamber and a reaction zone in series at a temperature in the range of 600° to 900° F. and a hydrogen pressure of 500 to 5,000 psi, said guard chamber and reaction zone each containing a fixed bed of hydrodesulfurization catalyst granules comprising supported Group VI-B and Group VIII metals, terminating the catalyst cycle while the upper portion of the catalyst in the reaction zone has a relatively high level of metals deposits and the lower portion of the catalyst in the reaction zone has a relatively low level of metals deposits, removing deactivated catalyst from the guard chamber, removing the catalyst from said reaction zone by gravity funnel flow through a bottom opening of the reaction zone so that said upper portion of the catalyst is removed before said lower portion and separated therefrom by discharging said upper portion of the catalyst from said process, passing at least a part of said lower portion of catalyst to said guard chamber, inserting fresh catalyst in said reaction zone, and resuming passage of residual oil and hydrogen downwardly through said guard chamber and reaction zones in series.

4,053,392

FRACTIONATION PROCESS

Hong-Kyu Jo, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Aug. 12, 1976, Ser. No. 713,940
Int. Cl.² C10G 7/00
U.S. Cl. 208—354 **3 Claims**



1. A process for fractionating hydrocarbons which comprises the steps of:

a. passing a feed stream comprising $C_2 - C_8$ hydrocarbons into an intermediate point of a first fractionation column operated at conditions effective to cause the separation of said feed stream into a first overhead vapor comprising $C_2 - C_6$ hydrocarbons and a first bottoms stream substantially free of C_6 hydrocarbons comprising C_7 and C_8 hydrocarbons, including a superatmospheric pressure and the passage of a reflux stream into the top of said first fractionation column and wherein said first bottoms stream is removed as a product stream from said first fractionation column;

b. admixing said first overhead vapor stream with a second overhead vapor stream and passing the resultant admixture through a condensing means, and passing a resultant mixed-phase condensing means effluent stream into an overhead receiver;

c. removing an off-gas stream comprising C_1 and C_2 hydrocarbons from said overhead receiver;

d. removing an overhead liquid comprising $C_3 - C_6$ hydrocarbons from said overhead receiver, and dividing said overhead liquid into two portions of equal composition;

e. passing a first portion of said overhead liquid into said first fractionation column as said reflux stream; and,

f. passing a second portion of said overhead liquid into an upper portion of a second fractionation column as the sole charge stream to said second fractionation column which is operated at conditions effective to cause the separation of said second portion of said overhead liquid into said second overhead vapor stream, which comprises, C_3 hydrocarbons and is substantially free of C_5 or heavier hydrocarbons, and a second bottoms stream comprising C_5 and C_6 hydrocarbons.

4,053,393

CYCLONE ASSEMBLY

Roger W. Day; George S. Ormsby, and Elvis Rich, all of Houston, Tex., assignors to Picenco International, Inc., Houston, Tex.

Filed Nov. 19, 1975, Ser. No. 633,405
Int. Cl.² B04C 5/085
U.S. Cl. 209—211 **30 Claims**

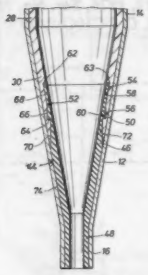
1. A cyclone liner assembly comprising:

a hollow liner body having a generally conical portion;

a tubular insert body having a generally conical portion disposed at least partially within said liner body coaxial

therewith and adjacent the smaller end of the conical portion of said liner body;

said liner body and said insert body having preformed inter-



engageable formations, generally laterally projecting as to one of said bodies and generally laterally receiving as to the other of said bodies, for preventing longitudinal movement of said insert body with respect to said hollow body.

4,053,394

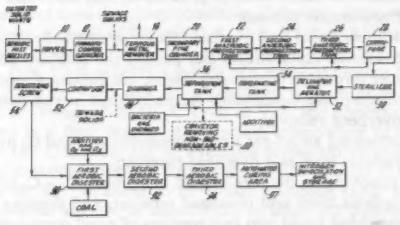
PROCESS FOR SEPARATING AND CONVERTING WASTE INTO USEABLE PRODUCTS

Pliny Fisk, Amazon Road & Dale St., Mohegan Lake, N.Y. 10547

Continuation of Ser. No. 462,132, April 18, 1974, abandoned, which is a division of Ser. No. 343,855, March 22, 1973, Pat. No. 3,847,803. This application Apr. 2, 1976, Ser. No. 672,876

Int. Cl.[2] C02C *1/08*; C05F *7/00*

U.S. Cl. 210—8 **29 Claims**



1. A process for converting waste comprising biodegradeable and non-biodegradeable materials into useable products, comprising the steps of:

grinding unsorted waste into particulate form;

anaerobically treating the unsorted waste particles;

sterilizing the anaerobically treated particles;

mixing the sterilized particles with an aerobic and enzyme activated liquid to form a slurry;

inducing the slurry to flow;

controlling the temperature and pH of the moving slurry to cause fermentation;

permeating the moving slurry with oxygenating gases to aid in fermentation and in causing the biodegradeable material to rise to the surface of the moving slurry and form a froth;

removing the biodegradeable froth from the top of the slurry;

collecting the non-biodegradeable material which settles out;

adjusting the moisture content of the biodegradeable material to approximately 55%;

separating the biodegradeable matter into batches and enclosing the batches in individual vessels;

aerobically treating the biodegradeable matter thus formed in batches thereby raising the internal temperature thereof;

controlling the environment to stimulate active aerobic bacterial growth in the batches; and

curing the decomposing material so that the carbon to nitrogen ratio becomes established at between about 17/1 and about 22/1.

4,053,395

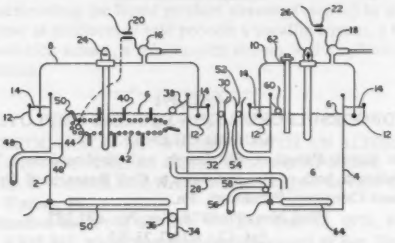
METHOD FOR PRODUCING METHANE GAS BY PROCESSING WASTE MATERIALS

Harold Switzgable, Freehold, N.J., assignor to Alpha Systems Corporation, Monmouth Junction, N.J.

Continuation of Ser. No. 499,751, Aug. 22, 1974, abandoned. This application May 28, 1976, Ser. No. 691,259

Int. Cl.[2] C02C *1/14, 1/17, 5/10*

U.S. Cl. 210—12 **7 Claims**



1. A method for producing methane gas by processing waste material consisting essentially of:

a. placing organic waste material into a first tank and a second tank, the first tank being interconnected by a conduit with the second tank for limited liquid waste material flow thereto and for full ion flow therebetween, the conduit being of a size small enough with respect to the capacity of the tanks to prevent any substantial flow of slurry between said first tank and said second tank and to prevent the introduction of any substantial amount of oxygen into said first tank and large enough to allow the free passage of ions, the level of liquid waste material being above the interconnecting conduit;

b. introducing an anaerobic bacterial inoculent into the first tank to interact with waste material therein;

c. introducing an aerobic bacterial inoculent into the second tank to interact with waste material therein;

d. positioning a cathode electrode in the first tank, said cathode being the only electrical terminal within said first tank;

e. positioning an anode electrode in the second tank to effect an electrolysis reaction with the cathode in the first tank by ion flow through the conduit therebetween, said anode being the only electrical terminal within said second tank;

f. applying an electrical current to said electrodes;

g. collecting methane produced in the first tank;

h. continuously supplying fresh waste material to the first tank;

i. continuously transferring waste material which has interacted with the anaerobic bacteria from the first tank to the second tank; and

j. continuously removing waste material from the second tank after interaction with aerobic bacteria therein.

4,053,396

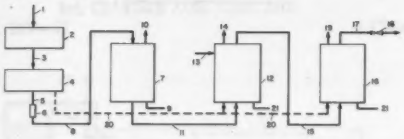
CONTROL OF AEROBIC BIOLOGICAL GROWTH IN ACTIVATED CARBON WASTE WATER TREATMENT

Ronald V. Trense, Metuchen; Allen Clamen, Westfield, and John M. Fernbacher, Madison, all of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 454,278, March 25, 1974, abandoned, which is a continuation of Ser. No. 267,231, June 28, 1972, abandoned. This application Jan. 20, 1975, Ser. No. 542,588

Int. Cl.[2] C02C *1/04, 5/04*

U.S. Cl. 210—17 27 Claims



1. In a process for removing suspended solids and dissolved organic contaminants from waste water having a COD of from about 100 to 2000 milligrams per liter and derived from the group consisting of petroleum refining, chemical manufacturing waste or mixtures thereof, wherein the waste water is pretreated to remove suspended solids therefrom and thereafter contacted with at least one bed of activated carbon to remove dissolved organic contaminants from the pretreated waste water, the improvement which comprises suppressing the evolution of hydrogen sulfide from the bed of activated carbon and minimizing the production of sludge in the bed due to biological oxidation by dissolving oxygen in the waste water in an amount in the range of from about 0.09 to about 0.15 pound of oxygen consumed per pound of total COD contaminants removed from the waste water in said bed of activated carbon prior to said waste water contacting at least one bed of activated carbon.

4,053,397

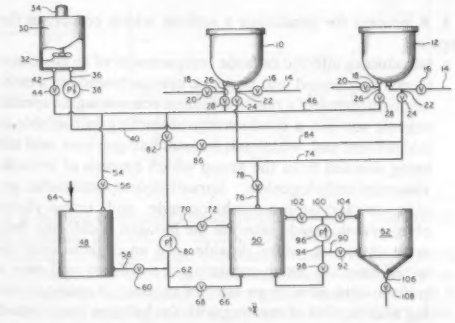
METHOD OF RECOVERING BACKWASH LIQUID WITH EXHAUSTED RESIN

George C. Flynn, Somerville, N.J., assignor to Ecodyne Corporation, Lincolnshire, Ill.

Continuation of Ser. No. 535,563, Dec. 23, 1974, abandoned. This application Mar. 10, 1976, Ser. No. 665,457

Int. Cl.[2] B01D *15/00*

U.S. Cl. 210—34 9 Claims



1. A method for recovering and reusing backwash liquid contaminated with dissolved and undissolved impurities and which is used to backwash a filter at the end of a service cycle, said filter being precoated with ion exchange resin particles in the size range of 60–400 mesh, comprising:

separating a major first portion of the undissolved impurities from a backwash liquid that has been used to backwash a filter in a previous backwash cycle so that a smaller second portion of the undissolved impurities remains with said liquid;

placing the remaining second portion of said undissolved impurities in suspension in said liquid from which the major first portion of the undissolved impurities has been separated;

delivering said liquid containing the remaining second portion of said undissolved impurities which has been placed in suspension through said precoated filter at the end of a service cycle of said precoated filter to remove said dissolved impurities and the remaining second portion of said undissolved impurities;

backwashing said filter with said liquid from which dissolved and undissolved impurities have been removed; and

storing said liquid for use in a later backwash operation.

4,053,398

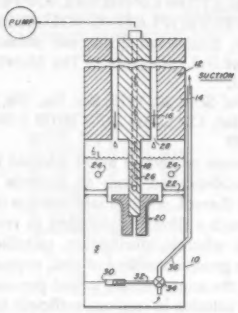
METHOD AND APPARATUS FOR WATER REMOVAL FROM OIL IN SUBMERSIBLE MOTOR ENVIRONMENT

Harry J. Venema, Wheaton, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Feb. 26, 1976, Ser. No. 662,191

Int. Cl.[2] B01D *15/00*

U.S. Cl. 210—41 6 Claims



1. A method for removing water which leaks into the housing of a submersible electric motor and into the lubricating oil in said housing in which said motor operates, said lubricating oil having a water-absorbing material dispersed therein which absorbs water in said oil, the steps comprising:

heating said oil and said water-absorbing material at a location in said housing removed from said motor to a temperature sufficient to free absorbed water from said water-absorbing material to this produce free water which because of its density flows to a collection zone in said housing adjacent to the heating location; and thereafter removing the collected free water from said collection zone to a zone outside said housing.

4,053,399

METHOD AND SYSTEM FOR WASTE TREATMENT

Lawrence A. Donnelly, Centerport; Leland C. Flocke, Elnora; Victor H. Himel, Port Washington; John J. Mikals; Alfred E. Munier, both of Huntington, and Lawrence Slote, Great Neck, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Apr. 30, 1975, Ser. No. 573,130

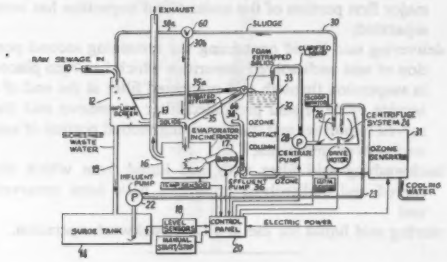
Int. Cl.[2] C02C *5/06;* C02B *1/38*

U.S. Cl. 210—44 20 Claims

1. A method for treating raw sewage comprising the steps of:

a. screening influent sewage to divide the influent sewage into solid waste matter and screened waste fluid;

b. incinerating the solid waste matter;
c. centrifuging the screened waste fluid to divide the screened waste fluid into sludge and clarified liquid;
d. incinerating the sludge;



e. passing ozone bubbles through the clarified liquid to divide the clarified liquid into foam entrapped solids, solids adhering to ozone bubbles, and disinfected liquid;
f. incinerating the foam entrapped solids and solids adhering to ozone bubbles; and
g. removing the disinfected liquid.

4,053,400

PURIFICATION OF NICKEL AND COBALT ELECTROPLATING SOLUTIONS

Reuven Merker, Englewood Cliffs, and Salvatore Lucca, Paramus, both of N.J., assignors to The Metalux Corporation, Paterson, N.J.

Filed Sept. 20, 1973, Ser. No. 398,992
Int. Cl.² C25D *3/12*; B01D *9/00*
U.S. Cl. 204—49 **2 Claims**

1. In the process wherein a metal selected from nickel and cobalt is electrodeposited from an aqueous acidic solution containing ions thereof, wherein said solution is at least periodically fed through a filtration chamber to remove impurities therefrom, and wherein, during use, metallic impurities selected from the group consisting of zinc, copper and iron build up in solution; the improvement in said process wherein there is added to the solution in amounts sufficient to precipitate the metallic impurities, whereby the metallic impurities are filtered out of said solution, an organic compound having the general formula a—S—X, wherein *a* represents the radical

in which R is a group selected from methyl, ethyl and butyl, S is sulphur, and X is one of the following: —H, —Na, —K, —Li, —*a* as defined hereabove, —S—H, —S—S—H, —S—S—S—H, —S—Na, —S—S—Na, —S—S—S—Na, —S—K, —S—S—K, —S—S—S—K, —S—Li, —S—S—Li, —S—S—S—Li, —S—a, —S—S—a, —S—S—S—a, and —Co—S—a.

4,053,401

SLUDGE TREATING PROCESS

Fumiaki Fukushima, Oojihon; Tasuku Sugita, Tokyo; Kohei Kobayashi, Tokyo; Hiroshi Asada, Tokyo, and Arata Onishi, Chofu, all of Japan, assignors to Nichireki Chemical Inudstry Co., Ltd, Tokyo, Japan

Filed Nov. 25, 1975, Ser. No. 635,493
Claims priority, application Japan, Nov. 29, 1974, 49-136296
Int. Cl.² C02C *5/02*
U.S. Cl. 210—52 **16 Claims**

1. A process for treating sludges containing mercury, cadmium, lead or arsenic as poisonous pollutants, which comprises adding to the sludges a bituminous emulsion and dodecyl mercaptan, thereby to coagulate and solidify the sludges.

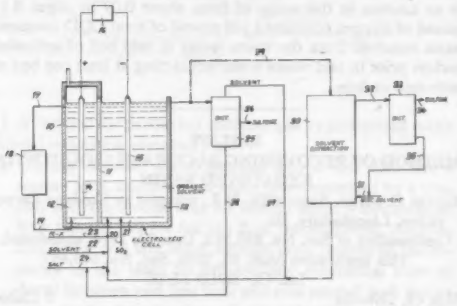
15. A process for treating sludges containing mercury as a poisonous pollutant, which comprises adding to the sludges a bituminous emulsion and colloidal sulfur, thereby to coagulate and solidify the sludges.

4,053,402

PROCESS FOR PRODUCING SULFONES

Bertel Kastening, and Dierk Knittel, both of Hamburg, Germany, assignors to Kernforschungsanlage Julich GmbH, Julich, Germany

Continuation-in-part of Ser. No. 474,167, May 29, 1974, Pat. No. 3,980,535. This application Jan. 9, 1976, Ser. No. 647,812
Claims priority, application Germany, Jan. 10, 1975, 2500727
Int. Cl.² C25B *3/04*
U.S. Cl. 204—59 R **6 Claims**



1. A process for producing a sulfone which comprises the steps of:
a. introducing into the cathode compartment of an electrolysis cell subdivided into an anode compartment and a cathode compartment a reaction system comprising an aprotic organic solvent, a conductivity-promoting salt soluble in said solvent and, which salt releases halogen ions, said salt being selected from the group which consists of tetraalkylammoniumhalogenide, tetraalkylphosphoniumhalogenide, tetraarylammoniumhalogenide and tetraarylphophoniumhalogenide wherein the halogen is chlorine, bromine or iodine, sulfur dioxide, and an organic ester selected from the group consisting of a sulfonic acid ester, a sulfuric acid ester or an ester of another oxygen-containing acid capable of reacting with the halogen ions released by said salt; and
b. electrolyzing said reaction system at a current density, temperature and voltage sufficient to transform said sulfur dioxide into SO_2^- ions and react said ester to produce the corresponding organosulfone in said cathode compartment, said organosulfone being separable from the solvent.

4,053,403

METHOD OF TREATING AND DEGERMINATING BATH WATER, PARTICULARLY BATH WATER CONTAMINATED BY THE GERM BACT. PSEUDOMONAS PYOCANEA, IN MEDICAL TUB-BATHS AND UNDERWATER MASSAGE BATHS

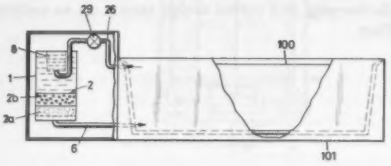
Bruno Bachhofer, Santisstrasse 85, 7981 Bavendorf; Anton Locher, Bergstrasse 6, 7981 Torkenweiler; Gerhard Skirde, Trelder Dorfstrasse, 2110 Buchholz-Trelde, and Hansjörg Quistorff, Babendiekstrasse 17, 2000 Hamburg-Blankenese, all of Germany

Filed Mar. 12, 1976, Ser. No. 666,485

Claims priority, application Germany, Mar. 15, 1975, 2511499; Feb. 20, 1976, 2606838

Int. Cl.[2] C02B *1/38;* C02C *5/02*

U.S. Cl. 210—62 1 Claim



1. A process for purifying bath water containing the organism bact. pseudomonas pyocanea comprising charging the water to be purified with ozone produced by an ozone generator and then filtering the ozone containing bath water with a first filter layer of fine grain activated charcoal and then filtering the thus filtered water with a second filter of a mixture of filter gravel and mineralized charcoal, both the first and second filters having been charged with bromine or hydrobromic acid, said bath water, before purification, being used as a coolant for said ozone generator.

4,053,404

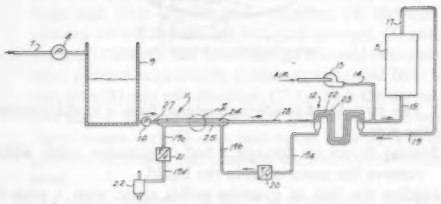
HEAT EXCHANGE METHOD FOR WET OXIDATION SYSTEMS

James W. Van Kirk, Stevensville, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Continuation of Ser. No. 590,274, June 25, 1975, abandoned. This application Jan. 10, 1977, Ser. No. 758,198

Int. Cl.[2] C02B *1/34, 3/08, 1/02*

U.S. Cl. 210—63 R 2 Claims



1. A method of treating organic waste sewage by continuous wet oxidation process, the method comprising:

treating the sewage in the presence of heat at a temperature of about 550°–560° F in a reactor; passing waste sewage as influent to said reactor from a pump in series through a first heat exchanger and downstream from said first heat exchanger through a second heat exchanger and then through an inlet into said reactor;

conducting treated liquid from said reactor as hot effluent through said second heat exchanger and then through a throttling device and thence to and through said first heat exchanger and from the first heat exchanger to a disposal point;

maintaining pressure of the effluent upstream from the throttling device and thereby the pressure in said second heat exchanger at about 1500 to 1600 psi and temperature of about 560° F; and

controlling the pressure downstream from the throttling device and in said first heat exchanger to be no greater than about 500 psi and temperature up to 400° F;

whereby the influent waste sewage in travelling from said pump to said reactor is preheated by heat from the effluent liquid in two stages, comprising a first stage in said frist heat exchanger and in which said effluent is at a lower pressure and temperature than in a second stage in said second heat exchanger in which said effluent is at higher pressure and temperature than the pressure and temperature in said first heat exchanger.

4,053,405

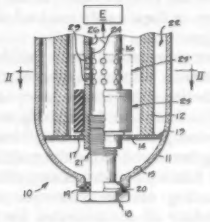
WARNING DEVICE AND METHOD FOR FUEL FILTERING SYSTEMS

Richard A. DeKeyser, Edelstein, and John H. Parks, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed June 25, 1976, Ser. No. 699,756

Int. Cl.[2] B01D *37/00;* C02B *3/02*

U.S. Cl. 210—65 20 Claims



1. A fuel filtering system for filtering water contaminated fuel in an operator controlled engine comprising

a case having an inlet passage and an outlet passage,

a filter disposed in said case to communicate said fuel from said inlet passage to said outlet passage,

reservoir means within said case for containing water which separates from said fuel, and

means responsive to an increasing water level in said reservoir means, said means functioning to progressively decrease flow of said fuel through said outlet passage to a minimum flow range, said minimum flow range functioning to be sufficient to continue operation of said engine while also being effective to alert said operator of said increasing water level.

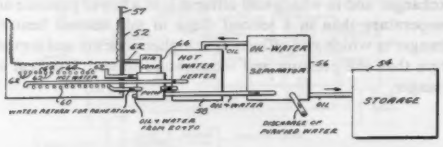
17. A method for alerting an operator of a vehicle that a fuel filtering system of an internal combustion engine thereof is contaminated with water, said filtering system comprising an inlet passage, reservoir means, and a filter for communicating fuel to an outlet passage during normal engine operation, comprising the step of progressively decreasing flow of said fuel from said inlet passage to said outlet passage and to said engine to some minimum flow range in response to the increasing level of accumulated water in said reservoir means, said minimum flow range functioning to be sufficient to continue operation of said engine in an idle or partial condition of operation sufficient to alert said operator of said increasing water level.

4,053,406

APPARATUS AND METHOD FOR RECOVERING OIL FROM ICY WATERS

Paul C. Deslauriers; Richard P. Voelker; Everett J. Lecourt, and Lawrence A. Schultz, all of Columbia, Md., assignors to Artec, Incorporated, Columbia, Md.

Filed Sept. 9, 1975, Ser. No. 611,689
Int. Cl.[2] E02B 15/04
U.S. Cl. 210—71 46 Claims



1. A method for cleaning-up an oil spill from a body of water containing oil-contaminated ice and floating oil, comprising:

a. providing a floating platform with a fore section and an aft section at opposite ends of a midship section, including a conveyor for loading oil-contaminated ice slabs onto the fore section, conveying these slabs along the midships section and then off of the floating platform at the aft section, wherein the floating platform includes:

i. a plurality of cutting devices in the fore section, which are mounted to cuttingly engage the oil-contaminated ice which is about to be loaded onto the conveyor, for reducing into slabs the oil-contaminated ice in the path of said floating platform,

ii. a first collector, in the fore section, for collecting floating oil from the body of water in the path of said floating platform as the ice slabs are loaded onto the floating platform therefrom;

iii. an oil removing station, in the midship section, with a cleaning device disposed adjacent the conveyor, for cleaning the ice slabs being conveyed therepast; and

iv. a second collector, in the midship section, for collecting oil draining from and being cleaned from the ice slabs being conveyed along the midship section;

b. moving said floating platform along said path while operating the cutting devices, conveyor and oil removing station, to reduce oil-contaminated ice in the path of the vessel into slabs, convey those slabs onto the fore section of the floating platform, clean the slabs in the oil removing station, collect oil draining from and cleaned from the ice into the collector, and conveying the thus-cleaned ice off the aft section of the floating platform.

4,053,407

METHOD FOR DISTRIBUTING A SLUDGE TO BE FILTERED OVER THE UPPER SURFACE OF THE FILTER CLOTH OF A ROTATING BELT FILTER

Rolf Gunnar Jonas Nordengren, Landskrona, Sweden, assignor to Nordengren Patenter AB, Landskrona, Sweden

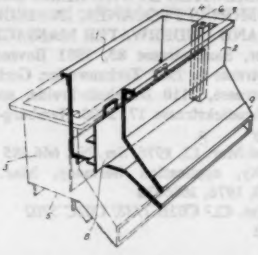
Filed Sept. 7, 1976, Ser. No. 720,718
Claims priority, application Sweden, Sept. 5, 1975, 7509896
Int. Cl.[2] C02B 1/22
U.S. Cl. 210—74 1 Claim

1. In the known method of filtering a sludge which is composed of calcium sulfate as the solid component and phosphoric acid as the liquid component, which method includes transporting a sludge to a point near an endless belt filter, depositing said sludge on said endless belt filter, and filtering at least a portion of the liquid away from said sludge while it is on said endless belt filter, the improvement which comprises:

a. introducing said sludge into a sludge receiving zone,

b. dividing said sludge into two separate streams in said sludge receiving zone so that one of said two separate streams contains a higher percentage of solids than the other of said two separate streams,

c. uniting said two separate streams so as to obtain a united sludge stream of substantially uniform solids content, and



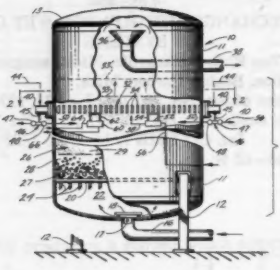
d. discharging said united sludge stream on an endless belt filter.

4,053,408

METHOD OF UPFLOW LIQUID TREATMENT

Theodore H. O'Cheskey, Whittier, Calif., assignor to U.S. Filter Corporation, Whittier, Calif.

Filed May 2, 1974, Ser. No. 466,289
Int. Cl.[2] B01D 25/06
U.S. Cl. 210—79 3 Claims



1. The method of removing material from a liquid comprising the steps of

flowing liquid up through a bed of granular solids which remove the material from the liquid,

holding the bed of granular solids static with a grate in contact with the solids until the solids are loaded with material removed from the liquid,

flowing liquid up through the bed at rate sufficient to cause the bed to fluidize and expand above the grate, whereby at least a portion of the material loaded in the bed while it was static is removed,

decreasing the flow of liquid up through the expanded bed to a rate which permits granular solids to settle,

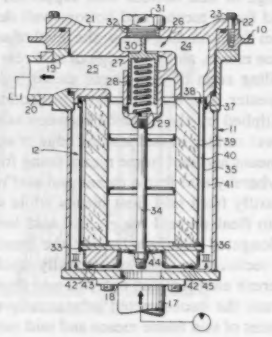
vibrating the grate and the solids as they settle to facilitate passage of solids down through the grate and increase the packing density of the solids in the bed below the grate, and

thereafter flowing additional liquid up through the static bed to remove material from the additional liquid.

4,053,409
REMOVABLE FILTER ASSEMBLY WITH BYPASS VALVE

Alvin L. Kuhfuss, Jr., Morton, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 562,383, March 26, 1975, abandoned.
This application May 27, 1976, Ser. No. 690,467
Int. Cl.[2] B01D *29/04*
U.S. Cl. 210—130 12 Claims



1. A removable filter assembly detachably mounted on and disposed within a stationary housing for removal as a unit therefrom, said housing having means defining an inlet at a lower end thereof and an outlet at an upper end thereof, said filter assembly comprising

a cover detachably mounted on said housing,

a support member attached to said cover in axially spaced relationship therefrom,

a tubular screen disposed fully axially between and in sealing contact with said cover and said support member and further disposed radially inwardly from said housing to define an annular chamber therebetween communicating directly with said inlet,

a tubular filter disposed within said screen to be substantially co-extensive axially therewith and positioned radially inwardly therefrom to define an annular passage therebetween which is isolated from said chamber totally by said screen, and

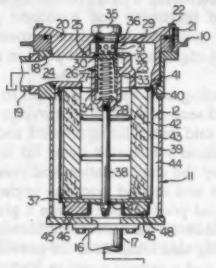
bypass valve means mounted on the upper end of said housing, closely adjacent to said outlet, and movable between a closed position for sequentially communicating fluid from said inlet (1) into said chamber, (2) through the entirety of said screen, (3) into said passage, (4) radially inwardly through said filter, and (5) into said outlet and an open position sequentially communicating said fluid from said inlet (1) into said chamber, (2) through the entirety of said screen, (3) into said passage, (4) through said bypass valve means and (5) into said outlet directly when the pressure of fluid in said chamber exceeds a predetermined level.

11. In a filter assembly of the type comprising a cover detachably mounted on a stationary support, a tubular filter, first passage means for normally communicating fluid from an inlet to said filter assembly, through said filter and to an outlet thereof and bypass valve means for bypassing said filter to communicate said fluid from said inlet, through second passage means to said outlet directly, the invention wherein said cover completely covers one end of said filter and said bypass valve means is solely mounted in said cover and a bolt threadably mounted in an aperture formed through said cover for solely exposing said bypass valve means for permitting removal thereof from said cover, said bypass valve means comprising a spool reciprocally mounted in a bore defined in said cover, spring means disposed between said cover and said spool for normally urging said spool upwardly towards said bolt and to a closed position and stop means formed on an upper closed end of said spool normally engaging said bolt to position said spool at its closed position.

4,053,410
FILTER ASSEMBLY WITH MODULATING BYPASS VALVE

Larry W. Lorimor, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 10, 1975, Ser. No. 612,157
Int. Cl.[2] B01D *29/04*
U.S. Cl. 210—132 15 Claims

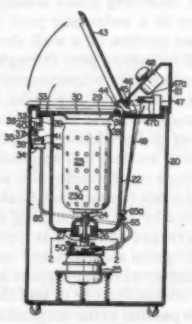


1. In a filter assembly of the type comprising a housing having an inlet and an outlet, a filter mounted in said housing and bypass valve means movable between a closed position for sequentially permitting communication of fluid from said inlet, through said filter and to said outlet and an open position for sequentially communicating fluid from said inlet, through a port of said bypass valve means and to said outlet, the improvement wherein said bypass valve means comprises a reciprocally mounted spool and pressure modulating means secured to said spool, comprising a tubular extension formed on an upper end of said spool having a plurality of metering orifices formed therethrough and continuously exposed to fluid from said inlets, for simultaneous movement therewith for modulating the pressure of said fluid through said bypass valve means upon opening thereof by metering fluid directly through said orifices, through said port and to said outlet to contol variable differential fluid pressures prevalent on downstream and upstream sides thereof.

4,053,411
AUTOMATIC CENTRIFUGE SAFETY LATCH SYSTEM

Tadashi Kawamura, Nagoya, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed July 7, 1976, Ser. No. 703,246
Claims priority, application Japan, July 10, 1975, 50-84873; Dec. 15, 1975, 50-169692[U]; Mar. 10, 1976, 51-28480[U]
Int. Cl.[2] B01D *45/12*
U.S. Cl. 210—146 12 Claims



1. A centrifugal dehydrator comprising:

an outer casing having an opening,

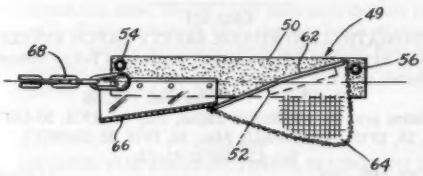
a spin basket facing said opening and rotatably disposed within said outer casing,
a driving motor having a driving shaft connected to said spin basket for rotating said spin basket,
switch means for connecting and disconnecting an electrical supply to said motor,
an inner lid for said outer casing opening for opening and closing said opening,
an outer lid for said outer casing opening for opening and closing said opening outside said inner lid,
a movable member mounted about said shaft for movement between an original and displaced position,
brake means including a first portion mounted on said shaft for rotation therewith and a second portion piovtably mounted on said member for movement between a braking position engaging said first portion and a release position,
means connecting said second portion to said outer lid for causing said second portion to move to said braking position when said outer lid is opened and to move to said release position when said outer lid is closed, the force produced by the shaft rotation and resultant engagement of said first and second portions urging said member to said displaced position is less than a given value,
lock means mounted for movement between a locking position engaging said inner door for preventing opening said inner door and a release position, and
means connecting said member to said lock means for causing said lock means to move to said locking position when said member is in said displaced position and to move to said release position when said member is in said original position,
means for urging said member toward said original position with a force greater than said given value, and
means for connecting said switch means to said outer lid for causing said switch means to disconnect when said outer lid is opened and connect when said outer lid is closed.

4,053,412

COLLECTING DEVICE FOR A SWIMMING POOL

William Stix, 4637 Pershing, St. Louis, Mo. 63108

Filed Jan. 19, 1976, Ser. No. 649,924
Int. Cl.[2] E04H 3/16
U.S. Cl. 210—169 8 Claims



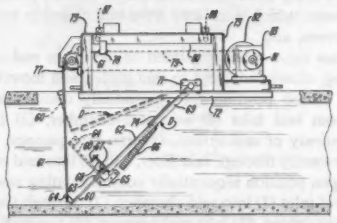
1. Apparatus for collecting debris floating upon the surface of a body of water in a swimming pool with a water inlet located in an upper portion of a wall thereof which causes water entering said swimming pool through said inlet to cause the water at that surface to flow continuously through a predetermined path that is substantially parallel to a section of one wall of said swimming pool, the flowing water thereby carrying said debris along said predetermined path and hence adjacent to said pool wall section, said apparatus comprising float means for supporting a readily removable net, said float means comprising spaced-apart longitudinal floats with the ends of said floats connected by first and second elongated members constructed and arranged to define an open rectangular area defined by said elongated members and said floats, said float means having spaced-apart frame-supporting surfaces thereon, means for flexibly connecting one of said elongated floats with its longitudinal axis parallel to the longitudinal axis of said pool wall section and hence substantially parallel to said predetermined path, while holding said float means substantially stationary relative to said pool wall section and substantially stationary relative to said flowing water, rigid frame means removably supported by said spaced-apart frame-supporting surfaces on said float means, said frame means being constructed and arranged to be approximately the same rectangular shape as said open rectangular area, a flexible net supported by said frame means, said net having a downwardly-extending shape defined by a bottom wall, opposed side walls, and a rear wall, an edge of said bottom wall supported by the leading edge of said frame means, said bottom wall depending downwardly from the extending below the level of said leading edge of said frame means, an upper edge of said rear wall supported by the trailing edge of said frame means, said net having a capacity greater than the horizontal projection of said frame means multiplied by the distance between said water surface and the lower surface of said leading edge of said frame means, said float means and said frame means being free of interacting fasteners whereby said frame means and said net can easily be lifted upwardly from said float means while said float means continues to float on said water, and said longitudinal floats and said elongated members leaving the front and the top of said open rectangular area substantially unobstructed at all times to permit unobstructed entry of said floating debris into, and to permit the unobstructed substantially-vertical separating movement of said frame means and said net from, said float means.

4,053,413

APPARATUS FOR REMOVING PARTICLES FROM WATER FOR SPRINKLERS AND THE LIKE

John M. Miller, Rte. 1, Box 273, Rocky Ford, Colo. 81067

Filed Nov. 17, 1975, Ser. No. 632,310
Int. Cl.[2] B01D 33/02
U.S. Cl. 210—104 15 Claims

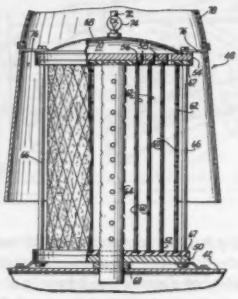


1. Apparatus for removing sediment and particles from water in a ditch or the like and adapted to be pumped to a plurality of sprinklers, comprising:
a cylindrical screen disposed lengthwise of said ditch and mounted for rotation about its longitudinal axis;
a liquid withdrawal conduit constructed and arranged to receive water from the inside of said screen;
means for moving sediment and particles deposited on said screen in a direction generally longitudinally of said screen to a point of removal, said moving means including a series of fluid nozzles for directing a flow of fluid longitudinally against the outside of said screen above the water at paths spaced both longitudinally and circumferentially of said screen; and
said nozzles being arranged so that each fluid nozzle, in turn, except the last will move said sediment and particles to the longitudinal path of the next nozzle as the screen rotates.

4,053,414
OIL RECOVERY APPARATUS

Cornelis in't Veld, Vlaardingen, Netherlands, assignor to National Marine Service, Inc., St. Louis, Mo.

Filed Aug. 3, 1976, Ser. No. 711,215
Claims priority, application Netherlands, Nov. 26, 1975, 7513810
Int. Cl.² B01D 21/24
U.S. Cl. 210—117 9 Claims



1. In an oil recovery apparatus having a separating tank therein, inlet means for directing an oil-water mixture into the upper portion of said tank and outlet means communicating with the bottom of said tank, the improvement comprising:
- said outlet means comprising an outlet manifold extending along the bottom of said tank;
- means defining a plurality of separate spaced flow paths between the interior of said tank and said manifold;
- a coalescing means extending across each of said flow paths to intercept and coalesce particles of oil in water flowing from said tank to said manifold, said coalescing means comprising a water permeable, oleophobic material;
- a cover member overlying each coalescing means to collect coalesced particles of oil rising therefrom but otherwise preventing flow of liquid into or out of the coalescing means from the top thereof;
- an outlet passage in the top of each cover member;
- a check valve in said passage arranged to permit liquid flow only upwardly and outwardly from beneath each cover member to the interior of said tank; and
- a generally conical, upwardly tapered hood member having a lower portion overlying said cover member and the said outlet passage in said cover member.

4,053,415
UNSATURATED POLYESTER ETHER HAVING A PHOTOCROSSLINKABLE MOIETY

Masato Satomura, Fujimiya, Japan, assignor to Fuji Photo Film Co., Ltd., Ashigara, Japan

Filed Jan. 9, 1976, Ser. No. 647,671
Claims priority, application Japan, Jan. 9, 1975, 50-5177
Int. Cl.² C08G 63/66
U.S. Cl. 204—159.19 12 Claims

1. A polyester ether having high molecular weight and film or fiber forming properties containing in its main chain the moiety represented by the formula:

$$-R_2OArR_3COO-$$

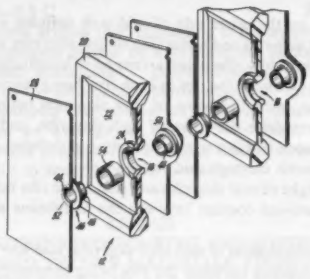
wherein Ar is arylene, R_2 is alkylene or oxaalkylene and R_3 is vinylene, butadienylene, or vinylene or butadienylene substituted by a group containing 6 or less carbon atoms.

3. A light-sensitive composition containing the polyester ether of claim 1 in combination with an amount of a sensitizing agent effective to render the combination light-sensitive.

4,053,416
FILTER PRESS ASSEMBLY

Laurence M. Howard, Cresskill, N.J., and Robert Schaaf, Brooklyn, N.Y., assignors to Air Filters, Inc., Brooklyn, N.Y.

Filed Sept. 13, 1976, Ser. No. 722,549
Int. Cl.² B01D 25/00
U.S. Cl. 210—227 9 Claims

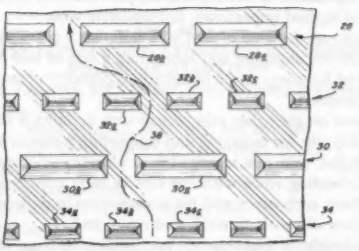


1. A method of hanging a filter cloth over the filter plate of a filter press, the filter plate having a center hole, the method comprising the steps of:
- a. selecting two sections of a filter cloth, each section containing a flexible coupling member having a tubular stem with a flanged base, the flanged base being secured to one side of the cloth and defining a hole in the cloth corresponding to a hole in the filter plate;
- b. fitting the tubular stem of one of the cloths into one end of a coupling cylinder;
- c. inserting the other end of the coupling cylinder through the hole in the filter plate;
- d. Adjusting the tubular stem of the other cloth into the other end of the coupling cylinder, said step of adjusting including:
  1. reversing the tubular stem such that it passes through the hole in the cloth and extends from the other side of the cloth;
  2. positioning the flanged base adjacent the other end of the coupling cylinder; and
  3. restoring the tubular stem to its original position and thereby locating it within the coupling cylinder; and
- e. closing the two cloths around the filter plate.

4,053,417
EMBOSSED SUPPORT MEMBER WITH HIGH AND LOW SKIP RIBS

Ferris E. Newman, Wauconda, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Oct. 8, 1975, Ser. No. 620,611
Int. Cl.² B01D 31/00
U.S. Cl. 210—321 B 6 Claims



1. An embossed and elongated flexible support member for use in a coil dialyzer for supporting an elongated semipermea-

ble membrane, which membrane is characterized by stretching further in the transverse direction than in the longitudinal direction, said support member comprising:

an elongated imperforate impermeable web;

means on one side of said web defining a plurality of angle ribs for engaging and supporting said membrane and for cooperation in defining a plurality of angular flow channels;

means on the other side of said web defining a plurality of high skip ribs and a plurality of low skip ribs, said high ribs and said low ribs being arranged in longitudinally extending rows with the ribs in each row being spaced from each other, with the rows of low skip ribs being positioned intermediate the rows of high skip ribs, and the spacing between ribs in a row cooperating in defining sinuous flow channels through said rows;

the height of said skip ribs and said angle ribs being effective to prevent contact between the membrane and the web; and

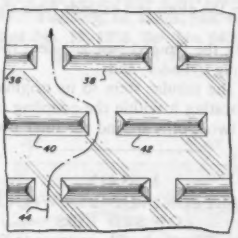
the configuration of said high skip ribs, said low skip ribs and the spacing between the ribs being dimensioned to maintain substantially equal flow rates on both sides of the membrane.

4,053,418

EMBOSSED MEMBRANE SUPPORT

Ferris E. Newman, Wauconda, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Oct. 8, 1975, Ser. No. 620,612
Int. Cl.² B01D *31/00*
U.S. Cl. 210—321 B **4 Claims**



1. An embossed and elongated flexible support member for use in a coil dialyzer for supporting an elongated, tubularly shaped, semipermeable membrane, which membrane is characterized by stretching further in the transverse direction than in the longitudinal direction, said support member comprising:

an elongated imperforate impermeable web;

means on one side of said web defining a plurality of angle ribs for engaging and supporting a side of said membrane and for cooperation in defining a plurality of angular flow channels;

means on the other side of said web defining a plurality of skip ribs for engaging and supporting a side of said membrane, said ribs arranged in a plurality of longitudinally extending rows with the ribs in each row being spaced from each other and for cooperation in defining sinuous flow channels through said rows; and

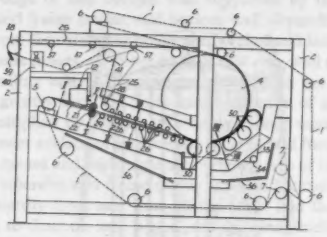
the height of said skip ribs and angle ribs being effective to prevent contact between said membrane and said web, wherein the height of said skip ribs are of a greater height than said angle ribs.

4,053,419

BAND FILTER PRESS

Jarmil Pav, Reutlingen, Germany, assignor to Firma Bruderhaus Maschinen GmbH, Reutlingen, Germany

Filed Nov. 2, 1976, Ser. No. 738,077
Claims priority, application Germany, Nov. 13, 1975, 2550956
Int. Cl.² B01D *33/04*
U.S. Cl. 210—386 **18 Claims**



1. A band filter press for separating liquid and solid matter by pressing a mixture thereof when located within an endless filter band consisting of a lower band having a center portion and two sidewall portions connected thereto defining an enclosure, and an upper band covering said enclosure along at least a portion of the length of said lower band, said filter press comprising in combination a loading zone including means for distributing material into the enclosure defined by said lower band before said upper band is positioned thereover, a pressing zone including means for applying pressure to said filter band when said upper band is positioned over said lower band for pressing liquid through said filter band as it passes through the pressing zone, an unloading zone including means for discharging solid matter from said lower band after said upper band is removed therefrom, collection means for collecting liquid pressed through said filter band, and means constructed and arranged to connect at least the lower lateral edges of said sidewall portions of said lower band to at least the lateral edges of said center portion thereof for providing a constant width to said center portion whereby the width of said center portion does not vary as said filter band passes through said pressing zone thereby permitting tracking control of said filter band by means adapted to sense the lateral edges of said lower band.

4,053,420

BLOOD FILTER

Günter Helmut Marx, Grafelfing, Germany, assignor to Dr. Eduard Fresenius Chemisch-Pharmazeutische Industrie KG., Bad Homburg, Germany

Filed Apr. 12, 1976, Ser. No. 676,539
Claims priority, application Germany, Apr. 14, 1975, 2516175
Int. Cl.² B01D *27/00, 35/00, 35/28*
U.S. Cl. 210—435 **5 Claims**

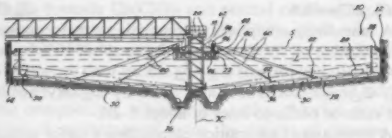
1. A filter for removing decayed blood corpuscles, aggregations of blood corpuscles and foreign components from the blood, comprising a filter housing having an inlet and an outlet, said housing containing a dense packing of fibres having substantially the same diameter as the blood corpuscles, said packing consisting of at least one plastics thread of sufficient length to prevent said at least one plastics thread from being carried away by the blood and from being released from said packing, said at least one plastics thread being crimped and arranged to form a mesh having a mesh width functioning to allow healthy blood cells to pass therethrough, said at least one plastics thread being formed from a material which will repel healthy blood cells, said decayed blood cells and said aggregations of blood corpuscles having no negative electric potential and thereby becoming deposited on said packing.

4,053,421

SEDIMENTATION TANK WITH RAKING STRUCTURE

Howard Pentz; R. Henry Weed, both of Lansdale, and John C. Lodholz, Perkasie, all of Pa., assignors to FMC Corporation, Chicago, Ill.

Filed June 23, 1976, Ser. No. 699,056
Int. Cl.[2] B01D *12/00, 17/00, 43/00*
U.S. Cl. 210—528 8 Claims



1. A raking structure for moving settled solids to a discharge opening in the bottom of a sedimentation tank comprising a rotatable member located in said tank and driven about a vertical axis, a rake arm supported at one end on said rotatable member on a pivot axis that is angularly related to said vertical axis and a horizontal plane, cable means having one end connected to said rake arm at a location spaced from said pivot axis, said cable means being located substantially along a plane extending through said vertical axis, a support located above said pivot axis on said rotatable member with said cable means entrained over said support, and counterweight means connected to an opposite end of said cable means, said cable means and counterweight means functioning to vertically pivot said rake arm through an angle Q, in response to a predetermined resistance to the rotation of said rake arm, said angle Q being defined by the equation:

$$\text{Tan } Q = W - C/T$$

where:

W = the component of moment acting on said rake arm, due to the vertical force of the weight of said rake arm,

C = the component of moment acting on said rake arm, due to said cable means and counterweight means, and,

T = the component of moment acting on said rake arm due to said predetermined resistance.

6. A raking structure for moving settled solids to a discharge opening in the bottom of a sedimentation tank comprising a rotating member located in said tank and driven about a vertical axis, a rake arm supported at one end on a pivot axis that is angularly related to said vertical axis and a horizontal axis so that said rake arm is pivoted about said axis when a predetermined torque load is developed on said arm and alterable means connected to said rake arm for determining said predetermined torque load, said means connected to said rake arm for varying said predetermined torque load functioning to vertically pivot said rake arm through an angle Q, in response to a predetermined resistance to the rotation of said rake arms, said angle Q being defined by the equation:

$$\text{Tan } Q = (W - C)/T$$

where:

W = the component of moment acting on said rake arm, due to the vertical force of the weight of said rake arm,

C = the component of moment acting on said rake arm, due to said alterable means connected to said rake arm for determining said predetermined torque load, and

T = the component of moment acting on said rake arm due to said predetermined resistance.

4,053,422

DRILLING FLUIDS CONTAINING POLYETHOXYLATED TETRAALKYL ACETYLENIC DIOLS

Thad O. Walker, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed June 16, 1976, Ser. No. 696,661
Int. Cl.[2] C09K *7/02*
U.S. Cl. 252—8.5 C 22 Claims

1. An aqueous drilling fluid containing in the aqueous phase clay solids dispersed therein by a ferrochrome lignosulfonate dispersant and containing a polyethoxylated tetramethyl decynediol or a sulfurized polyoxyethylated tetramethyl decynediol wherein the number of ethylene oxide groups therein is on an average of from 3.5 to about 30, said decynediol being present in said drilling fluid in an amount of from about 0.5 to about 5 pounds per barrel.

4,053,423

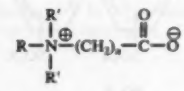
COMPOSITIONS FOR SOURING AND SOFTENING LAUNDERED TEXTILE MATERIALS, METHOD OF PREPARING THE SAME, AND STOCK SOLUTIONS PREPARED THEREFROM

John D. Ciko, Allen Park; John J. Cramer, and Geoffrey A. Jamieson, both of Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Jan. 30, 1975, Ser. No. 545,382
Int. Cl.[2] D06M *13/38*
U.S. Cl. 252—8.75 20 Claims

1. A stable homogeneous liquid composition for souring laundered textile materials and imparting softness thereto consisting essentially of

I. about 0.5–25% by weight of a softening agent for textile materials, the softening agent being a fatty amphoteric compound corresponding to the structural formula



wherein R is selected from the group consisting of monovalent alkyl radicals and sulfonated monovalent alkyl radicals containing about 8–22 carbon atoms, R′ is selected from the group consisting of monovalent alkyl radicals and sulfonated monovalent alkyl radicals containing about 1–3 carbon atoms, and n is about 1–6, the said amphoteric compounds having non-acidic isoelectric ranges;

II. about 3–50% by weight of an acidic souring agent for laundered textile materials selected from the group consisting of hydrofluorosilicic acid, ammonium silicofluoride and zinc silicofluoride; and

III. about 25–96.5% by weight of water;

the said ingredients I, II and III being present in amounts whereby a stable homogeneous liquid composition is produced.

4,053,424

GREASE CONTAINING SYNERGISTIC EXTREME PRESSURE ADDITIVES

Richard L. Coleman, Port Arthur, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Mar. 15, 1976, Ser. No. 666,556
Int. Cl.[2] C10M *3/18, 5/14, 7/20, 7/24*
U.S. Cl. 252—32.7 E 3 Claims

1. A grease comprising

a. a major amount of a lubricating oil,

b. a thickener,

c. the reaction product of butyl acid phosphate and dodecylaniline in an amount ranging from about 0.4 to 0.6 weight percent of the total mixture,

d. Bis(β-chlorophenethyl) disulfide present in an amount

ranging from about 1.5 to 2.5 weight percent of the total mixture, and

e. zinc dialkyldithiophosphate in an amount ranging from 1.5 to 2.5 weight percent of the total mixture.

4,053,425

SUCCINIMIDES OF AMINO AROMATIC SULFONIC ACID SALTS

El-Ahmadi I. Heiba, Princeton; Robert E. Kinney, Lawrenceville, and George E. Stead, South Plainfield, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

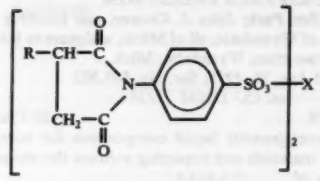
Division of Ser. No. 391,178, Aug. 24, 1973, abandoned. This application Nov. 24, 1975, Ser. No. 634,812

Int. Cl.² C10M *1/40, 3/34, 5/22, 7/38*

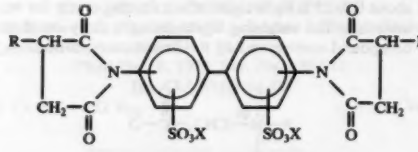
U.S. Cl. 252—33 **7 Claims**

1. A fluid composition comprising a major proportion of a fluid selected from the group consisting of lubricating oil and hydraulic fluid and a minor proportion sufficient to provide dispersant properties thereto of a compound of one of the formulae:

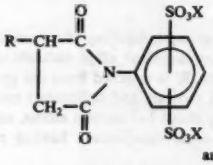
(1)



(2)

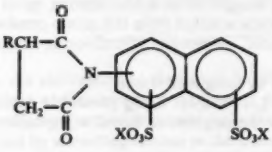


(3)



and

(4)



wherein X is selected from the group consisting of ammonium, organoammonium and metal and R is a hydrocarbyl containing from 5 to 1000 carbon atoms.

4,053,426

LUBRICANT COMPOSITIONS

Robert H. Davis, Pitman, and John W. Schick, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 17, 1975, Ser. No. 558,879

Int. Cl.² C10M *1/32*

U.S. Cl. 252—34 **3 Claims**

1. A water-base metal working fluid consisting essentially of water and, as a biocidal and anti-rust agent, the triethanolamine salt of the monomethyl ester of an alkyl or akenyl succinic acid, the alkyl or alkenyl substituent of which contains from about 6 to about 22 carbon atoms.

4,053,427

CROSS-SULFURIZED OLEFINS AND FATTY ACID MONOESTERS IN LUBRICATING OILS

Bruce W. Hotten, Orinda, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed July 26, 1971, Ser. No. 164,869

Int. Cl.² C10M *1/38, 3/32, 5/28, 7/36*

U.S. Cl. 252—48.6 **21 Claims**

1. A lubricating composition comprising a major proportion of a lubricating oil and from about 0.1 to about 10% by weight of a sulfurized mixture of C_{10}–C_{25} olefins with fatty acid esters of C_{10}–C_{25} unsaturated fatty acid and a C_1–C_{25} alkyl alcohol, in a mol ratio of olefin-to-ester of about 1–2:1.

8. A lubricating composition comprising a major proportion of a lubricating oil and from about 0.1 to about 10% by weight of a sulfurized mixture of C_{10}–C_{25} olefins with fatty acid esters of C_{10}–C_{25} unsaturated fatty acid and a C_1–C_{25} alkenyl alcohol, in a mol ratio of olefin-to-ester of about 1–2:1.

15. A lubricating composition comprising a major proportion of a lubricating oil and from about 0.1 to about 10% by weight of a sulfurized mixture of C_{10}–C_{25} olefins with fatty acid esters of C_{10}–C_{25} saturated fatty acid and a C_1–C_{25} alkenyl alcohol in a mol ratio of olefin-to-ester of about 1–2:1.

4,053,428

HYDROCARBON-SUBSTITUTED METHYLOL PHENOLS

John Francis Pindar, Euclid; Jerome Martin Cohen, University Heights, and Charles Peterson Bryant, Euclid, all of Ohio, assignors to The Lubrizol Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 540,470, Jan. 13, 1975, Pat. No. 3,980,569, which is a continuation-in-part of Ser. No. 451,644, March 15, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,664

Int. Cl.² C10M *1/20, 3/14, 5/12;* **C10L** *1/18*

U.S. Cl. 252—52 A **20 Claims**

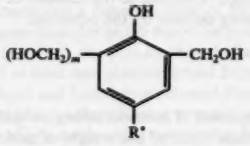
1. A fuel or lubricant composition containing a major proportion of a normally liquid fuel or a lubricating oil of lubricating viscosity and a minor proportion of a composition comprising at least one hydroxy aromatic compound having:

a. at least one hydroxyl substituent bonded directly to a carbon atom of an aromatic moiety, Ar,

b. at least one hydrocarbon-based substituent of at least about 50 aliphatic carbon atoms bonded directly to a carbon atom of the aromatic moiety, Ar, and

c. at least one methylol or lower hydrocarbon-based substituted methylol substituent bonded direcly to a carbon atom of the aromatic moeity, Ar, said compound containing no alkylene linkages between carbon atoms of two aromatic nuclei.

4. A composition as claimed in claim **1** wherein the hydroxy aromatic compound is of the general formula



wherein R* is an alkyl substituent of about 50 to about 300 carbon atoms derived from polymerization or interpolymerization of at least one 1-monoolefin of 2 to 10 carbon atoms and *m* is 1 or 0.

4,053,429

SAFETY-CALCIUM HYPOCHLORITE COMPOSITION

Seiji Tatara, Tokyo; Yasuo Morita; Makoto Nishonomiya, both of Nakago, and Masashi Kumoda, Johetsu, all of Japan, assignors to Nippon Soda Company, Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 518,064, Oct. 25, 1974, abandoned. This application June 30, 1976, Ser. No. 701,283
Claims priority, application Japan, Oct. 27, 1973, 48-121027
Int. Cl.[2] C01B *11/06*
U.S. Cl. 252—187 H 4 Claims

1. Safety-calcium hypochlorite composition which comprises a mixture of neutral anhydrous calcium hypochlorite having a formula $Ca(ClO)_2$ and neutral calcium hypochlorite trihydrate, having a formula $Ca(ClO)_2 \cdot 3H_2O$ said mixture containing 16% by weight to about 22% by weight of water and at least an amount of calcium hypochlorite corresponding to 60% by weight of the active chlorine content of a dry basis of the composition, wherein the active chlorine content is a number of percentage of twice the weight of chlorine of calcium hypochlorite divided by the weight of a mixture.

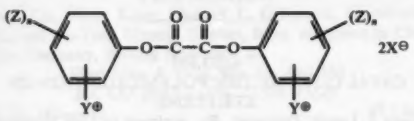
4,053,430

AQUEOUS CHEMILUMINESCENT SYSTEMS

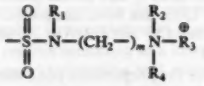
Arthur Gaudens Mohan, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed July 16, 1976, Ser. No. 705,863
Int. Cl.[2] C09K *11/06*
U.S. Cl. 252—188.3 CL 30 Claims

1. A water-soluble ester of oxalic acid having the formula:



wherein Z is selected from chloro, fluoro and bromo, *n* is 1 or 2, X^- is an anion and Y^+ is a radical having the formula:



wherein R_1 is an alkyl having 1 to 6 carbon atoms, R_2 and R_3 independently represent alkyl having 1 to 6 carbon atoms or together with the nitrogen atom form a piperidine ring, R_4 is selected from hydrogen and alkyl having 1 to 6 carbon atoms, and *m* is an integer from 1 to 4.

13. A composition useful for generating chemiluminescent emission comprising an aqueous solution of (a) a water-soluble ester of oxalic acid defined by claim 1 and (b) a water-soluble organic fluorescer having a spectral emission in the range from about 330 to 1,000 nanometers, in proportions capable of producing chemiluminescence on reaction with hydrogen peroxide.

4,053,431

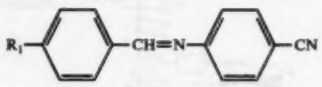
LIQUID CRYSTALLINE BIPHENYLS

Hanspeter Scherrer, Therwil, and Arthur Boller, Binningen, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 523,594, Nov. 14, 1974, Pat. No. 3,952,046. This application Dec. 22, 1975, Ser. No. 642,819
Claims priority, application Switzerland, Nov. 19, 1973, 16242/73
Int. Cl.[2] C09K *3/34*; G02F *1/13*
U.S. Cl. 252—299 15 Claims

2. A nematic composition which comprises a compound of the formula

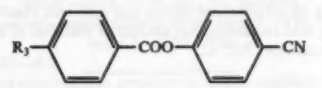
wherein R is straight-chain alkyl of 3 to 8 carbon atoms or straight-chain alkoxy of 3 to 10 carbon atoms, or mixtures thereof, and one or more compounds of the formula



wherein R_1 is straight-chain alkyl of 2 to 8 carbon atoms, straight-chain alkoxy of 4 to 7 carbon atoms, straight-chain alkanoyloxy of 2 to 8 carbon atoms or straight-chain alkylcarbonate of 2 to 11 carbon atoms.

4. A nematic composition which comprises a compound of the formula

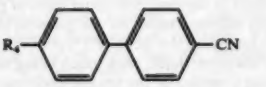
wherein R is straight-chain alkyl of 3 to 8 carbon atoms or straight-chain alkoxy of 3 to 10 carbon atoms, or mixtures thereof, and one or more compounds of the formula



wherein R_3 is straight-chain alkyl of 4 to 8 carbon atoms, straight-chain alkoxy of 5 to 8 carbon atoms or straight-chain alkylcarbonate of 3 to 11 carbon atoms.

5. A nematic composition which comprises a compound of the formula

wherein R is straight-chain alkoxy of 3 to 10 carbon atoms, or mixtures thereof, and one or more compounds of the formula

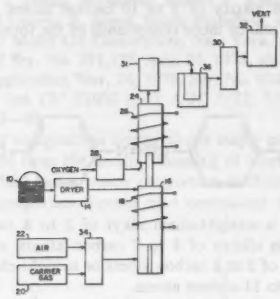


wherein R_4 is straight-chain alkyl or straight-chain alkoxy.

4,053,432
VOLUME REDUCTION OF SPENT RADIOACTIVE ION-EXCHANGE MATERIAL

Erich W. Tiepel, Export; Christopher K. Wu, Wilkins, and Arnold S. Kitzes, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 2, 1976, Ser. No. 663,035
Int. Cl.[2] G21F 9/32
U.S. Cl. 252—301.1 W 10 Claims



1. A process for reducing the volume of spent ion-exchange material comprising the steps of:

drying the spent ion-exchange material to a moisture content of less than 50 percent by weight:

supplying said dried ion-exchange material to a fluid-bed reactor;

inserting a carrier gas selected from the group consisting of inert gases, non-oxygenated gases and limited-free-oxygen-containing gases into said fluid-bed reactor to fluidize said ion-exchange material;

heating said ion-exchange material to a temperature less than 500° C in a limited oxygen atmosphere to thermally decompose said ion-exchange material, said thermal decomposition producing an effluent gas;

removing the gaseous mixture of said carrier gas and said effluent gas from said fluid-bed reactor;

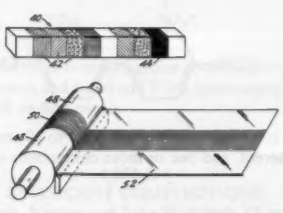
inserting an oxygen-containing gas into said reactor; and

burning said remaining ion-exchange material at a temperature less than 700° C.

4,053,433
METHOD OF TAGGING WITH COLOR-CODED MICROPARTICLES

Pui Kum Lee, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 19, 1975, Ser. No. 551,061
Int. Cl.[2] C09K 3/00; C10L 1/10; C06B 23/00
U.S. Cl. 252—408 18 Claims



1. In a method of tagging individual units of production of a substance with microparticles for the purpose of retrospective identification including the steps of: (1) providing an inventory of batches of microparticles, each batch being uniquely coded, (2) maintaining a record of the unique code employed in each batch and (3) incorporating microparticles from any one batch with only one unit of production of a substance, the improvement comprising the use of microparticles which comprise compilations of, and are encoded according to, a particular orderly sequence of visually color distinguishable dyed and/or pigmented layers of organic materials, each said microparticle being 1 to 1000 micrometers at its broadest dimension across the color sequence, which inventory includes up to $(C)(C-1)^{n-1}$ uniquely coded batches of microparticles where C is the number of available colors and n is the number of layers in the sequence.

4,053,434
EXHAUST GAS CONVERSION CATALYST

Dennis P. McArthur, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed July 19, 1976, Ser. No. 706,684
Int. Cl.[2] B01J 23/40
U.S. Cl. 252—432 14 Claims

1. A porous, catalytic composite effective for the simultaneous conversion of nitrogen oxides, carbon monoxide and hydrocarbons in engine exhaust gases, said composite comprising a mixture of two separate components, A and B, component A comprising a porous, inert support having dispersed thereon a minor proportion of nickel and/or cobalt and a still smaller proportion of rhodium, and being essentially free of platinum and palladium, component B comprising a porous inert support having dispersed thereon a minor proportion of platinum and/or palladium and being essentially free of rhodium.

4,053,435
CATALYSTS FOR THE POLYMERIZATION OF ETHYLENE

Thomas J. Lynch, Oakmont, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Division of Ser. No. 557,498, March 12, 1975. This application Sept. 2, 1975, Ser. No. 609,191
The portion of the term of this patent subsequent to Aug. 31, 1993, has been disclaimed.
Int. Cl.[2] B01J 21/08, 29/00
U.S. Cl. 252—451 3 Claims

1. In a process for the preparation of an ethylene polymerization catalyst in which a chromium polymerization catalyst is deposited on a silica support and activated; the improvement which consists of preparing the supported catalyst under rigorously anhydrous conditions and employing as the catalyst support a silica aerogel having a surface area of at least about 300 square meters per gram and a pore volume of at least about 2 milliliters per gram, said values being determined by isothermal liquid nitrogen desorption analysis; said silica aerogel having been prepared by a modified Kistler process consisting essentially of the steps of:

a. preparing a silica hydrogel,

b. treating the silica hydrogel with an organic solvent that will dissolve at least 10 weight % water to free the silica hydrogel of water, at least the final contact being with a rigorously anhydrous organic solvent so that the organic solvent, after reaching equilibrium with the silica hydrogel, contains less than 200 ppm of water,

c. removing the organic solvent from the organic solvent — silica hydrogel mixture of step (b) by heating the mixture to above the critical point in a pressure-resistant vessel and releasing the organic solvent therefrom at a pressure at least equal to the critical pressure of the organic solvent,

d. cooling the silica aerogel from step (c) to ambient temperature and pressure under rigorously anhydrous conditions, and

e. calcining the silica aerogel from step (d) at an elevated temperature in a rigorously anhydrous environment.

4,053,436

SPRAY DRIED TITANIUM-CONTAINING CATALYST FOR STRESS CRACK RESISTANT POLYMER

John P. Hogan, and Donald D. Norwood, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 26, 1975, Ser. No. 607,977
Int. Cl.[2] B01J *37/02, 29/00*
U.S. Cl. 252—452 7 Claims

1. A catalyst produced by a process comprising forming a hydrogel by contacting an alkali metal silicate with a material selected from the group consisting of acids, acidic salts, and carbon dioxide, said hydrogel having coprecipitated therewith a titanium compound; spray drying said thus-formed hydrogel to form a xerogel; thereafter calcining said xerogel to form said catalyst, said catalyst containing in addition 0.1 to 20 wt. % chromium calculated as CrO_3 based on the total weight of said catalyst.

7. A catalyst according to claim 1 wherein said hydrogel is produced by adding sodium slicate to sulfuric acid which sulfuric acid contains titanyl sulfate, aging said thus formed hydrogel at an elevated temperature and washing to remove sodium ions; said chromium is incorporated by impregnating said xerogel with an aqueous solution of CrO_3; and said calcining is carried out at a temperature within the range of 900°–1700° F.

4,053,437

POLYOLEFIN CATALYST AND METHOD FOR ITS PREPARATION

Joseph Liu, Hong Kong; Howard L. Grimmett, Lincolnshire, Ill., and Yu-Tang Hwang, Clinton, Iowa, assignors to Chemplex Company, Rolling Meadows, Ill.

Filed Mar. 4, 1976, Ser. No. 664,030
Int. Cl.[2] B01J *21/04, 21/08, 23/26*
U.S. Cl. 252—458 40 Claims

1. The method of preparing a polyolefin catalyst, comprising: preparing a mixture by dispersing on a finely divided, difficult to reduce, inorganic support of the class consisting of silica, alumina, thoria, zirconia, titania, magnesia and mixtures and composites thereof an organic chromium compound pyrolytically decomposable in the substantial absence of oxygen to deposit a catalyst residue including as a contaminant a carbon residue on said support; activating said mixture by subjecting the mixture to non-oxidative pyrolysis to and at an activating temperature within the range of about 600°–2000° F., thereby depositing on said support a catalytically active residue for the polymerizing of 1-olefins of 2–8 carbon atoms and copolymerizing said olefins with 1-olefins of 2–20 carbon atoms, said residue including a black carbon deposit residue; and substantially removing said black carbon deposit by burning in an oxidizing gas at an elevated temperature for a short period of time sufficient to burn off said black carbon deposit residue, thereby simultaneously modifying and improving the characteristics of the resulting activated catalyst.

4,053,438

PROPENE TRIMER ALCOHOL PERFUME COMPOSITIONS

Robert S. DeSimone, Middletown, N.Y., assignor to Polak's Frutal Works, Inc., Middletown, N.Y.

Filed Aug. 4, 1976, Ser. No. 711,341
Int. Cl.[2] C11B *9/00*
U.S. Cl. 252—522 4 Claims

1. A perfume composition comprising an olfactory effective amount of propene trimer alcohol having a refractive index (N_D^{20}) of about 1.4308 to 1.4359 and density of about 0.8261 to 0.8317 and being essentially free of straight chain and primary alcohols or an ester of such a propene trimer alcohol with a carboxylic acid having 1 to 4 carbon atoms and at least one other olfactory ingredient.

4,053,439

LOW-SMOKE GENERATING POLYURETHANE FOAM

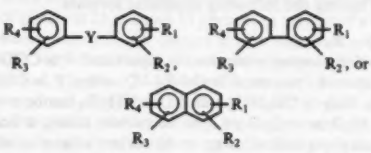
Stanley J. Chlystek, Mountville, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed May 28, 1976, Ser. No. 691,090
Int. Cl.[2] C08G *18/22*
U.S. Cl. 260—2.5 AJ 10 Claims

1. A flame-retardant, smoke-inhibited polyurethane foam having incorporated therein a flame-retardant and smoke-inhibiting composition comprising in combination a halogen-containing, fire-retardant organic material in an amount sufficient to render the final foam selfextinguishing and a smoke-inhibiting amount of at least one metallic salt of an organic polycarboxylic acid free of acid functionality of the formula

$$[R(CO_2)_n]_mA$$

wherein R is



wherein R_1 is carboxylate and R_2, R_3 and R_4 are independently selected from the group consisting essentially of hydrogen and carboxylate with at least one being carboxylate and Y is a bridging group selected from the group consisting of C_1-C_6 alkylene, carbonyl, sulfonyl and oxygen; A is a metal selected from the Periodic Table Group, I, II, III or IV; *n* is b 2, 3, or 4; and *m* is 1/2, 1, 2, 3, or 4.

4,053,440

LATEX COMPOSITIONS SENSITIVE TO HEAT

Jean Claude Bonnet, 41 avenue de France, Blois (Loir & Cher), and Alain Ribba, 16 rue Ronsard, Chateaurenault (Indre & Loire), both of France

Filed Aug. 1, 1975, Ser. No. 601,042
Claims priority, application France, Aug. 2, 1974, 74.27662
Int. Cl.[2] C08L *7/02*
U.S. Cl. 260—4 R 5 Claims

1. A latex composition sensitive to heat consisting essentially of a natural or synthetic latex and 0.5 to 5 parts by weight per 100 parts by weight of dry solids of the latex of a urethane-oxylalkylene copolymer having the formula:

$$(O{=}C{=}N{\rightarrow}_x R{\leftarrow}NH{-}CO{-}O{\leftarrow}C_nH_{2n}{-}O{\rightarrow}_y R']_p$$

in which R is an aliphatic or aromatic structure which can contain biuret groups, urethane groups or isocyanate groups, R' is selected from the group which consists of hydrogen, lower alkyl having 1 to 8 carbon atoms and of straight or branched chain, aryl and alkylaryl, *x* is 0 or 1, *y* is always greater than 2, *n* has a value of 2 to 4 inclusively, and *p* has a value at least equal to 5.

4,053,441

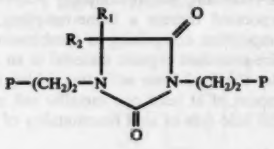
HYDANTOIN POLYAMIDE-POLY(OXYETHYLENE) BLOCK COPOLYMERS AS ANTISTATIC ADDITIVES FOR POLYAMIDES

Kenneth Boone Wagener, Asheville; Bron Walter Spivey, Jr., Arden, and James Mood Chapman, Jr., Asheville, all of N.C., assignors to Akzona Incorporated, Asheville, N.C.

Filed Nov. 29, 1976, Ser. No. 745,933
Int. Cl.[2] C08L *77/00, 91/00*
U.S. Cl. 260—18 N 21 Claims

1. An antistatic yarn polymer additive composition consist-

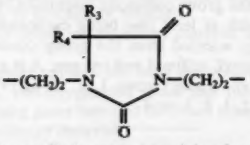
ing essentially of a hydantoin polyamide-poly(oxyethylene) block copolymer comprising the reaction product of a hydroxy-terminated poly(oxyethylene) having a number average molecular weight of about 200 to about 4000, with a prepolymer comprising the reaction product of a first compound having the structural formula:



wherein R_1 and R_2 are alkyl groups containing from 1 to 6 carbon atoms and P is COOH or CH_2NH_2, with a second compound from the group consisting of piperazine or a compound having the following structural formula:

$$Q-R_5-Q$$

where if the second compound is piperazine, P is COOH; and if the second compound is Q—R_5—Q, when P is COOH, Q may be NH_2 or CH_2NH_2, when Q is NH_2,R_5 can be a straight chain alkylene radical of 3 to 12 carbon atoms, a branched chain alkylene radical of up to 36 carbon atoms, an alicyclic radical or a radical having the following structural formula:



where R_3 and R_4 are alkyl groups containing from 1 to 6 carbon atoms and when Q is CH_2NH_2, R_5 can be of the above or an aromatic radical; and when P is NH_2 or CH_2NH_2, Q is COOH, and R_5 is selected from the group consisting of a straight chain alkylene radical of 2 to 12 carbon atoms, a branched chain alkylene radical of up to 36 carbon atoms, an aromatic radical and a radical having the structural formula III above.

4,053,442

METHOD FOR MANUFACTURING SHAPED ARTICLES FROM MULTI-BLOCK COPOLYMERS

Václav Jungr; Artur Stoy; Vladimir Stoy, and Jiri Zima, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Aug. 18, 1975, Ser. No. 605,509

Claims priority, application Czechoslovakia, Aug. 28, 1974, 5924/74

Int. Cl.² C08F *1/86*

U.S. Cl. 260—29.6 R **10 Claims**

1. Method for manufacturing shaped articles from multi-block copolymers of acrylonitrile with acrylamide and/or acrylic acid and diacryl imide, said copolymers containing the structure of polyacrylonitrile determinable by X-ray analysis, wherein said copolymers having swelling capacities ranging from 10 to 95% of water (by weight) are formed by pressure in presence of an agent capable of swelling only the amorphous (hydrophilic) phase but incapable of dissolving the material at ambient temperature, the forming being carried out at temperatures that are higher than the glass transition point of any polymeric phase present in the system but lower than 250° C., to a shaped article with substantially unchanged structure and chemical composition.

10. A molding manufactured by the method of claim **1.**

4,053,443

SEALING COMPOUND

Franklin G. Reick, Westwood, N.J., assignor to Michael Ebert, Mamaroneck, N.Y., a part interest

Filed July 20, 1976, Ser. No. 707,014

Int. Cl.² C08L *27/18*

U.S. Cl. 260—29.6 F **8 Claims**

1. A sealing composition comprising an inert filler, an aqueous dispersion of polymers of tetrafluoroethylene lubricating particles in which particles of colloidal size are intermingled with particles of microscopic size, an acidic gelling agent, and an alkali activator for the gelling agent, said activator including an ingredient which renders the compound freeze-thaw stable.

4,053,444

COLLOIDAL POLYAMIC ACID ELECTRODEPOSITION COMPOSITIONS AND PROCESS FOR PREPARING SAID COMPOSITIONS

David C. Phillips, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 245,396, April 19, 1972, abandoned. This application Apr. 24, 1975, Ser. No. 571,131

Int. Cl.² C08J *3/08*; C08K *5/20, 5/41, 5/34*

U.S. Cl. 260—30.2 **13 Claims**

1. A method of making a nonaqueous, colloidal, polyamic acid electrodeposition composition comprising the steps of:

A. providing a salt solution comprising: 1 part by weight of organic aromatic polyamic acid, about 29–37 parts by weight of a non-aqueous, organic, non-electrolizable, aprotic solvent for the polyamic acid and an amount of nitrogen containing base, selected from the group consisting of tertiary amines and imidazoles effective to form an organic acid salt, and

B. adding the salt solution to about 50–150 parts by weight of a non-aqueous, organic, non-electrolizable, non-solvent for the salt which is not capable of dissolving the acid salt, to provide a colloidal dispersion of the salt within the solvent mixture,

the composition having a pH of between 8–10 and a solids content of between about 0.5 wt.% to about 1.5 wt.% based on polyamic acid and total solvent.

4,053,445

SOLUTIONS OF ETHYLENE-CHLOROTRIFLUOROETHYLENE COPOLYMERS

Stephen R. Schulze, Gillette, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 1, 1976, Ser. No. 737,231

Int. Cl.² C08K *5/02, 5/10, 5/15, 5/20*

U.S. Cl. 260—31.2 R **10 Claims**

1. A solution comprising a copolymer of about 55 to 95 mol percent chlorotrifluoroethylene and about 45 to 5 mol percent ethylene dissolved in an organic solvent.

4,053,446

PROCESS FOR PREPARING HIGH TEAR-STRENGTH POLYDIENE POLYURETHANE

Yoji Watabe, Fuchu; Michio Ishii, Murayama; Yutaka Iseda, Tachikawa; Kouei Komatsu; Noboru Ohshima, both of Yokkaichi, all of Japan, and Yozo Nakata, deceased, late of Kawasaki, Japan (by Kiichi Nakata, legal successor), assignors to Bridgestone Tire Company, Ltd. and Japan Synthetic Rubber Company, Ltd., both of Tokyo, Japan

Filed Aug. 31, 1976, Ser. No. 719,130

Claims priority, application Japan, Sept. 9, 1975, 50-108519

Int. Cl.² C08G *18/62*; C08K *3/04*

U.S. Cl. 260—37 N **11 Claims**

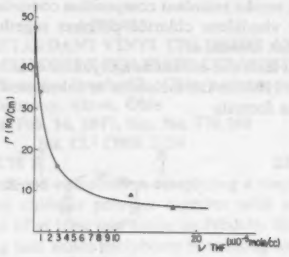
1. A process for preparing a polydiene polyurethane having high tear strength, which process comprises reacting

a. a polydiene glycol prepared with use of a dilithio com-

pound as a catalyst, and having a functionality of from 1.8 to 2.1 and a number average molecular weight of from 1,000 to 5,000, the residual lithium content being below 30 ppm,

b. a diisocyanate compound, and

c. a chain-extending agent selected from diamine and diol compounds by the prepolymer method, the equivalent



ratio of the isocyanate groups in said polydiene glycol being 1.5 to 3.0, the equivalent ratio of active hydrogens in said chain-extending agent to isocyanate groups in said prepolymer being 0.8 to 1.1, and the curing temperature being 50 to 140° C, the polydiene polyurethane so obtained having a chemical cross-link density of 4×10^{-5} mole/cc or less.

4,053,447

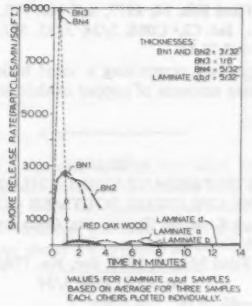
SYNTHETIC RESIN COMPOSITION-METHOD AND PRODUCT

Lawrence E. Shea, 165 Lake Drive, San Bruno, Calif. 94066

Continuation-in-part of Ser. No. 492,881, July 29, 1974, abandoned. This application June 1, 1976, Ser. No. 691,290

Int. Cl.² B65H *81/00*; C08G *8/06, 8/22*; C08K *3/40*

U.S. Cl. 260—38 **20 Claims**



1. A tough, fire-resistive resin exhibiting low flame spread, good heat release and low smoke evolution when exposed to direct flame or to radiant heat and being resistant to embrittlement and cracking upon curing, consisting essentially of the reaction product of:

a. at least one resorcinol component chosen from the group consisting of resorcinol, a mixture of resorcinol and phenol, and a partially cured resin of phenol, resorcinol and formaldehyde,

b. paraformaldehyde, and

c. at least one second substance chosen from the group consisting of furfural and furfuryl alcohol,

d. said paraformaldehyde and said second substance being added in sufficient amounts to produce said tough, fire-resistive resin.

20. A fire-resistant molded body comprising a reaction product of a resorcinol component chosen from the group consisting of resorcinol, a mixture of resorcinal and phenol, and a partially cured resin of resorcinol, phenol, and formaldehyde, and paraformaldehyde plus at least one substance chosen from the group consisting of furfural and furfuryl alcohol, and including fiberglass, said paraformaldehyde and said substance being added in sufficient amounts to provide a tough, flexible resin of low flame spread and smoke evolution when compared with red oak wood and having satisfactory resistance to cracking and embrittlement.

4,053,448

POLYESTER BASED PATCHING COMPOSITION

Arthur William Holle, 8858 W. 47th St., Brookfield, Ill. 60513

Filed June 21, 1976, Ser. No. 698,059

Int. Cl.² C08K *3/34, 3/36*

U.S. Cl. 260—40 R **14 Claims**

1. A thermosetting patching composition for the filling of dents, holes and similar imperfections in metal surfaces comprised of (1) about 35 to about 55 percent by weight of a binder component comprised of a mixture of an unsaturated polyester resin and a vinylidene monomer solvent copolymerizable with the polyester; (2) about 35 to about 55 percent by weight of a filler component comprised of an admixture of silica and an alkaline inorganic powder having a pH greater than 7, the silica and the alkaline inorganic powder being present at a weight ratio ranging from 1:3 to 3:1 and (3) about 3 to about 10 percent by weight of inorganic hollow microspheres.

4,053,449

FAST-IDLE CAM APPARATUS IN A CARBURETOR

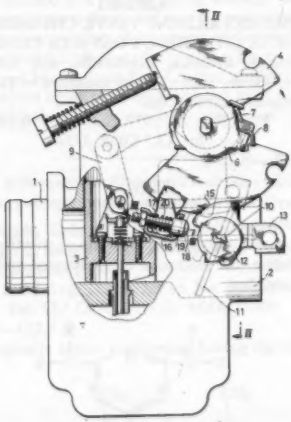
Yuichi Yoshioka, Asaka, and Tsugio Sanka, Wako, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo and Kabushiki Kaisha Keihin Seiki Seisakusho, Kawasaki, both of, Japan

Filed Feb. 20, 1976, Ser. No. 660,029

Claims priority, application Japan, Feb. 26, 1975, 50-25431

Int. Cl.² F02M *1/02*

U.S. Cl. 261—44 R **8 Claims**



1. A fast-idle cam apparatus for a carburetor having a throttle valve, a choke valve, and a mechanism for opening an closing the throttle valve, said fast-idle cam apparatus comprising means for moving the choke valve and the throttle valve together to respective initial positions for engine starting at low temperature, said choke valve being closed in its initial position, said throttle valve being open in its initial position, and a spring mechanism interposed in the moving means for absorbing closing movement of the throttle valve while the choke valve remains in its initial position, said choke valve

including an operation lever with a fast-idle cam portion thereon, said moving means acting on said fast-idle cam portion, said choke valve being openable by said operation lever for ordinary driving conditions.

4,053,450

DIALKYL ALKYL AND CYCLIC PHOSPHORAMIDOMETHYL PHOSPHONATES

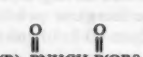
Peter Golborn, Skelmersdale, England, and James J. Duffy, Buffalo, N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Division of Ser. No. 618,720, Oct. 1, 1974, Pat. No. 4,018,560, which is a continuation of Ser. No. 438,481, Jan. 31, 1974, abandoned, which is a continuation-in-part of Ser. No. 239,799, March 30, 1972, Pat. No. 3,812,218. This application Dec. 30, 1976, Ser. No. 755,884

Int. Cl.² C08K 5/51

U.S. Cl. 260—45.8 R 12 Claims

1. An article comprising a resin composition and a flame retardant amount of a compound of the formula



wherein R′ is phenyl, lower alkenyl and halogen substituted and unsubstituted lower alkyl of 1–6 carbon atoms, *m* is an integer from 1–2 wherein when *m* is 2, R is alkoxy of 1–8 carbon atoms and when *m* is 1, R is alkylene dioxy of 2–8 carbon atoms.

4,053,451

SMOKE RETARDANT VINYL CHLORIDE AND VINYLIDENE CHLORIDE POLYMER COMPOSITIONS

William Joseph Kroenke, Brecksville, and Arthur Watkins McRowe, Akron, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

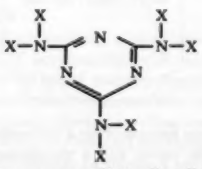
Filed Feb. 14, 1977, Ser. No. 770,169

Int. Cl.² C08K 5/34

U.S. Cl. 260—45.75 C 12 Claims

1. A smoke retardant composition comprising a vinyl chloride or vinylidene chloride polymer together with a smoke retardant amount of

A. at least one melamine molybdate or substituted melamine molybdate, the melamine or substituted melamine having the formula



wherein X is hydrogen or an alkyl, alicyclic, aralkyl, alkaryl, aryl or heterocyclic group containing from 1 to 10 atoms of C, O, S and/or N, and with two X's on each of one or more nitrogen atoms optionally being joined together to form a heterocyclic ring; and

B. at least one compound selected from the group consisting of CuI, Cu_2O, CuO, CuSCN, $CuSO_4$, Cu(II) acetylacetonate, and hydrates thereof.

4,053,452

SMOKE RETARDANT VINYL CHLORIDE AND VINYLIDENE CHLORIDE POLYMER COMPOSITIONS

William Joseph Kroenke, Brecksville, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

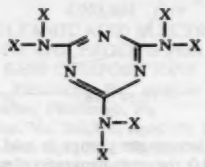
Filed Mar. 4, 1977, Ser. No. 774,557

Int. Cl.² C08K 5/34

U.S. Cl. 260—45.75 M 10 Claims

1. A smoke retardant composition comprising a vinyl chloride or vinylidene chloride polymer together with a smoke retardant amount of

A. at least one melamine molybdate or substituted melamine molybdate, the melamine or substituted melamine having the formula



wherein X is hydrogen or an alkyl, alicyclic, aralkyl, alkaryl, aryl or heterocyclic group containing from 1 to 10 atoms of C, O, S and/or N, and with two X's on each of one or more nitrogen atoms optionally being joined together to form a heterocyclic ring; and

B. at least one compound selected from the group consisting of $CoCO_3$, Co_2O_3, cobalt (II) acetylacetonate, cobalt (III) acetylacetonate, and hydrates thereof.

4,053,453

VINYL HALIDE POLYMERS HAVING IMPROVED RESISTANCE TO BURNING AND SMOKE FORMATION

Arthur Watkins McRowe, Akron, and William Joseph Kroenke, Brecksville, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Feb. 14, 1977, Ser. No. 770,170

Int. Cl.² C08K 5/34, 5/35, 5/17

U.S. Cl. 260—45.75 C 18 Claims

1. A composition comprising a vinyl halide polymer and smoke retardant amounts of copper oxalate and an amine molybdate.

4,053,454

SMOKE RETARDANT VINYL CHLORIDE AND VINYLIDENE CHLORIDE POLYMER COMPOSITIONS

William Joseph Kroenke, Brecksville, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

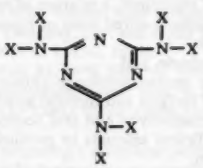
Filed Mar. 4, 1977, Ser. No. 774,555

Int. Cl.² C08K 5/34

U.S. Cl. 260—45.75 N 10 Claims

1. A smoke retardant composition comprising a vinyl chloride or vinylidene chloride polymer together with a smoke retardant amount of

A. at least one melamine molybdate or substituted melamine molybdate, the melamine or substituted melamine having the formula



wherein X is hydrogen or an alkyl, alicyclic, aralkyl,

alkaryl, aryl or heterocyclic group containing from 1 to 10 atoms of C, O, S and/or N, and with two X's on each of one or more nitrogen atoms optionally being joined together to form a heterocyclic ring; and

B. at least one compound selected from the group consisting of nickel oxide, nickel (II) oxalate, nickel (II) acetylacetonate, and hydrates thereof.

4,053,455

SMOKE RETARDANT VINYL CHLORIDE AND VINYLIDENE CHLORIDE POLYMER COMPOSITIONS

William Joseph Kroenke, Brecksville, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Feb. 14, 1977, Ser. No. 770,168
Int. Cl.[2] C08K 5/34
U.S. Cl. 260—45.75 R 22 Claims

1. A smoke retarded composition comprising a vinyl chloride or vinylidene chloride polymer together with a smoke retardant amount of at least one amine molybdate, the amine used in preparing said amine molybdate containing from 1 to 40 carbon atoms and from 1 to 10 primary, secondary or tertiary amine groups or a mixture thereof.

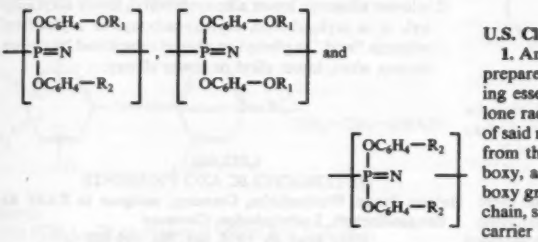
4,053,456

POLY(ARYLOXYPHOSPHAZENE) COPOLYMERS

Ronald L. Dieck, and Edwin J. Quinn, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Feb. 27, 1976, Ser. No. 661,862
Int. Cl.[2] C08J 9/06
U.S. Cl. 260—47 P 13 Claims

1. A copolymer having randomly distributed repeating units represented by the formulas:



wherein R_1 is C_1–C_4 linear or branched alkyl, and R_2 is hydrogen, C_1–C_{10} linear or branched alkyl or C_1–C_4 linear or branched alkoxy, with the proviso that when R_2 is alkoxy, OR_1 and R_2 are different, the ratio of $(OC_6H_4—OR_1)$:$(OC_6H_4—R_2)$ being from about 1:6 to about 6:1.

4,053,457

MANUFACTURE OF POLYAMIDES

Claus Cordes, Weisenheim, and Franz Zahradnik, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Rheinland-Pfalz, Germany

Filed Dec. 29, 1975, Ser. No. 644,960
Claims priority, application Germany, Jan. 15, 1975, 2501348
Int. Cl.[2] C08G 69/46
U.S. Cl. 260—78 L 9 Claims

1. In a process for the manufacture of polyamides from ε-caprolactam and/or other polyamide-forming starting compounds by polymerization and subsequent extraction of the polymer, the improvement comprising: concentrating the aqueous extract containing water, monomer and oligomers in the absence of atmospheric oxygen, wherein the surfaces which comes into contact with the extract are made of materials which are inert under the conditions of the concentration process, and polymerizing the concentrate, without further purification or separation, by itself or together with other polyamide-forming starting materials.

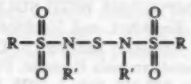
4,053,458

VULCANIZABLE RUBBER FORMULATIONS WITH BIS(SULFONAMIDO)SULFIDE

Robert J. Arnold, Evanston, and Marion J. Gattuso, Hoffman Estates, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 571,340, April 24, 1975, abandoned, which is a continuation-in-part of Ser. No. 454,628, March 25, 1974, abandoned. This application May 27, 1976, Ser. No. 690,830
Int. Cl.[2] C08F 19/20
U.S. Cl. 260—79.5 A 9 Claims

1. A vulcanizable diene rubber formulation containing, as an inhibitor against premature vulcanization thereof, a compound having the formula:



in which R and R′ are independently selected from the group consisting of alkyl of from 1 to about 6 carbon atoms, cycloalkyl having from 3 to about 8 carbon atoms in the ring, phenyl and tolyl radicals.

4,053,459

ANTIBODY SPECIFIC TO METHAQUALONE AND ITS METABOLITES

James Gordon Christenson, North Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Sept. 24, 1975, Ser. No. 616,451
Int. Cl.[2] A61K 37/06; C07D 239/00
U.S. Cl. 260—112 B 3 Claims

1. An antibody specific to methaqualone and its metabolites prepared by innoculating a host animal with an antigen consisting essentially of a methaqualone hapten having a methaqualone radical bonded to a spacing group through the tolyl ring of said methaqualone radical, said spacing group being selected from the group consisting of an amino carbonylalkylene carboxy, an oxyloweralkylene carboxy and a lower alkylenecarboxy group and having from 2 to 7 carbon atoms in the linking chain, said hapten being covalently bonded to an immunogenic carrier material through the carboxyl group of said spacing group.

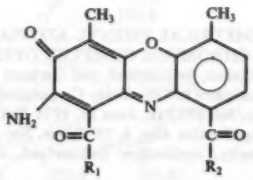
4,053,460

AZETOMICINS

Martin A. Apple, Daly City, Calif., and Joseph V. Formica, Richmond, Va., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Aug. 18, 1975, Ser. No. 605,425
Int. Cl.[2] C07C 103/52; A61K 37/00
U.S. Cl. 260—112.5 R 6 Claims

1. A biologically active compound having the formula:



wherein R_1 and R_2 are five membered peptide lactones with the first peptide member counting from the multiple-ringed structure derived from threonine and the fifth peptide member

derived from methyl-valine or methyl-isoleucine and with the lactone linkage extending from the first to the fifth member on each said peptide and wherein the third member of at least one of said peptides is selected from the group consisting of an azetidine-2-carbonyl moiety.

4,053,461

REACTION PRODUCT OF 4,4-BIS-(HYDROXYMETHYL)-CYCLOHEXENE COMPOUNDS WITH SULFUR

Werner Schwarze, Frankfurt, and Siegfried Wolff, Bornheim-Merten, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

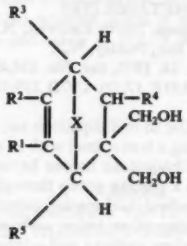
Division of Ser. No. 548,218, Feb. 7, 1975, Pat. No. 3,968,074. This application Mar. 9, 1976, Ser. No. 665,446

Claims priority, application Germany, Apr. 22, 1974, 2419235

Int. Cl.[2] C07G *17/00*

U.S. Cl. 260—125 **17 Claims**

1. The sulfur containing reaction products of (a) a 4,4-bis-(hydroxymethyl)-cyclohexane compound of the formula



I

where R^1, R^2 and R^4 are hydrogen, methyl or phenyl and there is also present either (1) X as the bridging member methylene or ethylene or (2) X is absent and there are present both R^3 and R^5 wherein R^3 and R^5 are hydrogen, methyl or phenyl with (b) 0.1 to 20 atoms of sulfur per mole of compound I.

4,053,462

UNSYMMETRICAL PHENYL AZO NAPHTHYL CHROMIUM COMPLEX DYES

Fabio Beffa, Riehen, Switzerland, and Gerhard Back, Lorrach, Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

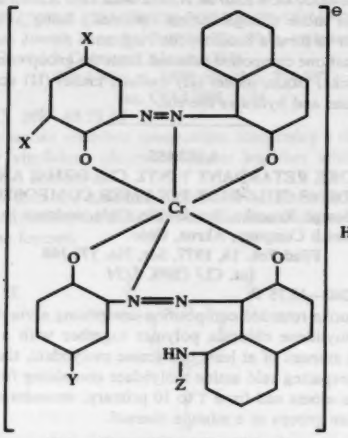
Division of Ser. No. 479,918, June 17, 1974, Pat. No. 4,005,065. This application Aug. 4, 1976, Ser. No. 711,199

Claims priority, application Switzerland, June 22, 1973, 9184/73

Int. Cl.[2] C09B *45/16*; D06P *1/10, 3/24, 3/32*

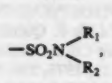
U.S. Cl. 260—145 B **1 Claim**

1. A chromium complex dye, which, in the form of its free acid, has the formula



wherein one X is sulfo and the other X is nitro,

Y is



where

R_1 and R_2 together with the nitrogen to which they are attached represent pyrrolidino, piperidino or morpholino; and

Z is lower alkanoyl, lower alkoxycarbonyl, lower alkylsulfonyl, or is arylcarbonyl, aryloxycarbonyl or arylsulfonyl wherein "aryl" is phenyl or phenyl substituted by chloro, bromo, nitro, lower alkyl or lower alkoxy.

4,053,463

HETEROCYCLIC AZO PIGMENTS

Helmut Junge, Wachenheim, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed June 25, 1976, Ser. No. 699,988

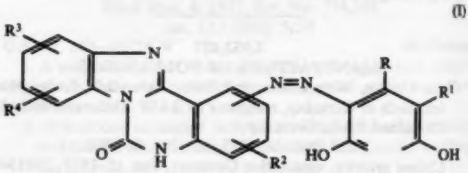
Claims priority, application Germany, July 26, 1975, 2533529

Int. Cl.[2] C09B *29/36*; D06P *1/04, 1/44, 2/79*

U.S. Cl. 260—154 **2 Claims**

1. An anzo compound of the formula:

(I)



in which

R is hydrogen or methyl;

R^1 is cyano or carbamoyl;

R^2 is hydrogen, bromo, chloro, methyl, methoxy, ethoxy or cyano;

R^3 is hydrogen, chloro, bromo, methyl, methoxy, ethoxy, cyano, carbomethoxy, carbamoyl, sulfamoyl or methylsulfonyl; and

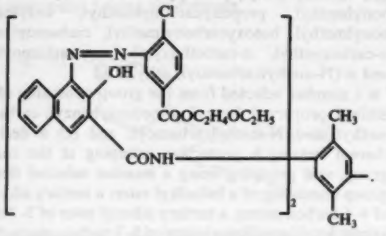
R^4 is hydrogen, chloro, bromo, methyl, methoxy or carbomethoxy.

4,053,464
DISAZO PIGMENTS CONTAINING ETHER SUBSTITUTED ALKOXY CARBONYL GROUPS

Armand Roueche, Bottmingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed June 17, 1974, Ser. No. 479,732
Claims priority, application Switzerland, June 26, 1973, 9326/73
Int. Cl.² C09B 33/14, 43/12
U.S. Cl. 260—174 1 Claim

1. Disazo pigment of the formula

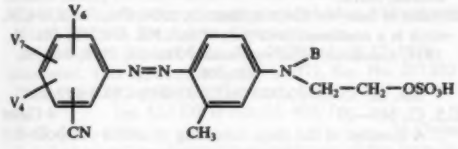


4,053,465
CYANOPHENYL-AZO-AMINOPHENYL DYESTUFFS

Winfried Kruckenberg, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 11, 1975, Ser. No. 612,431
Claims priority, application Germany, Sept. 11, 1974, 2443482
Int. Cl.² C09B 29/08, 29/26; D06P 1/06, 3/24
U.S. Cl. 260—207.3 2 Claims

1. Water-soluble dyestuff which in the form of the free acid corresponds to the formula



wherein

B is $(CH_2)_x$—H or propenyl where x is 1, 2, or 3;
V_4 is hydrogen, chlorine, or cyano;
V_6 is hydrogen or methyl; and
V_7 is hydrogen, chlorine, or methyl.

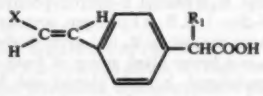
4,053,466
(E)-2-[P-(β-SUBSTITUTED-VINYL)PHENYL]ALKANOIC ACIDS

Shoji Yoshimura, Chofu; Susumu Takahashi, Hachioji; Motonobu Ichino, and Tokuro Nakamura, both of Mitaka, all of Japan, assignors to Kohjin Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 594,461, July 9, 1975, abandoned. This application Sept. 28, 1976, Ser. No. 727,484
Claims priority, application Japan, July 9, 1974, 49-77782
Int. Cl.² C07D 307/26, 307/28, 333/10, 333/12
U.S. Cl. 542—454 10 Claims

1. An (E)-2-[p-(β-substituted-vinyl)phenyl]alkanoic acid represented by the formula (I):

(I)



wherein R_1 represents a hydrogen atom, a methyl group or an ethyl group; and X represents a

group or a

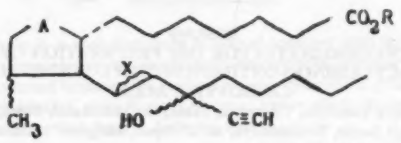
group, wherein R_2 represents a hydrogen atom, a nitro group, an amino group, a hydroxyl group, a halogen atom, an alkyl group having 1 to 4 carbon atoms or an alkoxy group having 1 to 4 carbon atoms, and the pharmaceutically acceptable salts thereof.

4,053,467
PROSTAGLANDIN DERIVATIVES

Wenling Kao, Devon, and Donald P. Strike, St. Davids, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 485,411, July 3, 1974, abandoned. This application July 25, 1974, Ser. No. 491,711
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² C07D 309/22; C07C 61/36
U.S. Cl. 260—240 R 12 Claims

1. A compound of the structure:



wherein A is CHOH or C=O; R is H or alkyl of from 1 to 6 carbon atoms, and

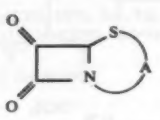
i. X is a single bond; or
ii. X is a trans double bond.

4,053,468
PROCESS FOR PREPARING 7-OXO CEPHALOSPORINS AND 6-OXO PENICILLINS

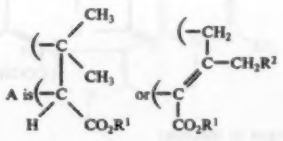
Kenneth G. Holden, Haddonfield, N.J., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Feb. 25, 1976, Ser. No. 661,230
Int. Cl.² C07D 501/04
U.S. Cl. 544—30 15 Claims

1. A process for preparing a compound of the formula:



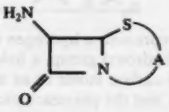
in which:



R^1 is hydrogen or an easily removable conventional penicillin or cephalosporin ester protecting group; and

R^2 is hydrogen, acetoxy or SHet where Het is a five or six membered heterocyclic ring containing carbon and one to four atoms selected from the group consisting of N, O and S, each such ring being unsubstituted or substituted with one or two groups selected from alkyl, alkoxyalkyl and trifluoromethyl, each alkyl or alkoxy group having from one to four carbon atoms,

comprising reacting, in the presence of a non-hydroxylic solvent, a 7-amino cephalosporin or 6-amino penicillin of the formula:



in which A, R^1 and R^2 are defined as above, with a carbonyl containing oxidizing agent selected from the group consisting of:

mesitylglyoxal,
3-nitromesitylglyoxal,
3,5-dinitromesitylglyoxal,
benzothiazole-2-carboxaldehyde,
6-nitrobenzothiazole-2-carboxaldehyde,
3,5-di-i-propyl-1,2-benzoquinone,
3-methyl-5-i-propyl-1,2-benzoquinone,
tetrachloro-1,2-benzoquinone
tetrabromo-1,2-benzoquinone,
2,6-di-t-butyl-1,4-benzoquinone and
3,5-di-t-butyl-1,2-benzoquinone,

said reaction being carried out with removal of water.

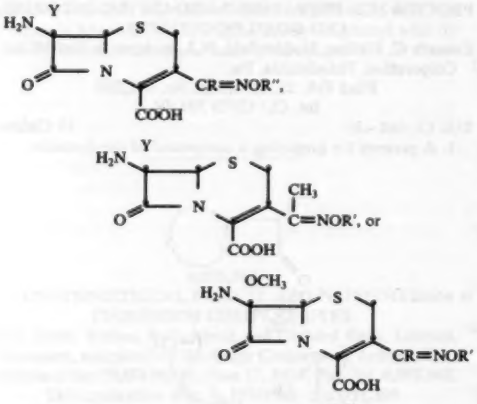
4,053,469

INTERMEDIATES FOR THE PREPARATION OF 7-ACYLAMINO-3-OXYIMINOMETHYL-3-CEPHEM-4-CARBOXYLIC ACIDS

Mitsuru Yoshioka, Toyonaka; Masayuki Murakami, Itami, and Yuji Sendo, Nishinomiya, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Division of Ser. No. 446,112, Feb. 26, 1974, Pat. No. 3,987,039. This application Apr. 5, 1976, Ser. No. 673,882
Claims priority, application Japan, Feb. 28, 1973, 48-24512
Int. Cl.[2] C07D *501/18*
U.S. Cl. 544—21 **2 Claims**

1. A compound selected from the group consisting of (1) a compound of the formula:



wherein

Y is hydrogen or methoxy
R is hydrogen or methyl;
R′ is a member selected from the group consisting of hydrogen, methyl, ethyl, n-propyl, iscpropyl, n-butyl, isobutyl, secondary butyl, tertiary butyl, n-pentyl, secondary pentyl, neopentyl, n-hexyl, 2-chloroethyl, 2-bromoethyl, 2-chloropropyl, 3-chloropropyl, 2,3-dichloropropyl, 4-bromobutyl, 2-chlorohexyl, methoxymethyl, methoxyethyl, methoxypropyl, ethoxyethyl, norbornyloxymethyl, propoxypropyl, methylthiomethyl, methylthioethyl, methylthiopropyl, N,N-dimethylaminoethyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, 4-methylcyclohexyl, benzyl, 4-nitrobenzyl, 4-methoxybenzyl, phenyl, tolyl, xylyl, mesityl, 4-ethylphenyl, α-naphthyl, β-naphthyl, vinyl, allyl, hexenyl, cyclohexenyl, ethinyl, propargyl, carboxymethyl, methoxycarbonylmethyl, ethoxycarbonylmethyl, propoxycarbonylmethyl, hexyloxycarbonylmethyl, butoxycarbonylmethyl, carbamoylmethyl, α-carboxyethyl, α-carbethoxyethyl, α-carbamoylethyl, and α-(N-methylcarbamoyl) ethyl; and
R″ is a member selected from the group consisting of allyl, ethinyl, propargyl, benzyl, p-methoxybenzyl, carbamoylmethyl, and N-methylcarbamoyl, and (2) a derivative thereof bearing a protective grouping at the carboxyl group, said grouping being a member selected from the group consisting of a haloalkyl ester, a tertiary alkyl ester of 4–6 carbon atoms, a tertiary alkenyl ester of 5–7 carbon atoms, a tertiary alkynyl ester of 5–7 carbon atoms, benzyl ester, methoxybenzyl ester, nitrobenzyl ester, 3,5-di-(tertiary butyl)-4-hydroxybenzyl ester, acetoxymethyl ester, pivaloyloxy-methyl ester, benzhydryl ester, phenacyl ester, trimethylsilyl ester, succinimidomethyl ester, phthalimidomethyl ester, and the 1,2-di-isopropylhydrazide.

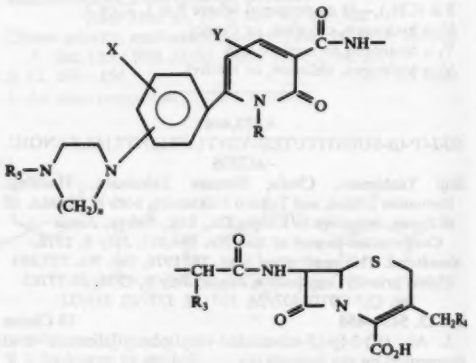
4,053,470

SUBSTITUTED-1,2-DIHYDRO-2-OXONICOTINYL-CEPHALOSPORINS

Leonard Doub; James S. Kaltenbronn, and Dieter Schweiss, all of Ann Arbor, Mich., assignors to Parke, Davis & Company, Detroit, Mich.

Division of Ser. No. 534,031, Dec. 23, 1974, Pat. No. 3,954,734, which is a continuation-in-part of Ser. No. 434,763, Jan. 21, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,098
Int. Cl.[2] C07D *501/20*; A61K *31/545*; C07D *499/44*
U.S. Cl. 544—25 **4 Claims**

1. A member of the class consisting of amido compounds of the formula



and pharmaceutically acceptable salts thereof; wherein R is hydrogen or methyl: R_3 is phenyl, p-hydroxyphenyl; 2-thienyl and cyclohexa-1,4-dien-1-yl, R_4 is hydrogen, acetoxy or 1-pyridyl with the proviso that when R_4 is 1-pyridyl, the CO_2H is $—CO_2—$, and R_5 is a lower alkyl group of from one to six carbon atoms, cyclohexyl, benzyl, phenyl and halophenyl wherein halo represents chlorine, fluorine, bromine or iodo, X

is hydrogen, chlorine or bromine; Y is hydrogen or bromine and *n* is two or three with the proviso that when *n* is three R_5 is methyl.

4,053,471

4-THIAZOLIDINONE DERIVATIVES

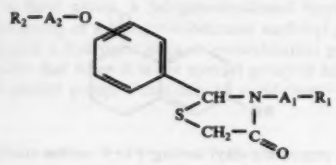
John Krapcho, Somerset, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Nov. 11, 1976, Ser. No. 740,705

Int. Cl.² C07D *295/14, 277/14*

U.S. Cl. 544—133 **11 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein R_1 is alkyl, cycloalkyl or aryl; R_2 is alkylamino, dialkylamino, 1-pyrrolidinyl, 1-piperidinyl, 4-morpholinyl, 1-piperazinyl, or 4-alkyl-1-piperazinyl; A_1 is a saturated bond or an alkylene group having 1 to 4 carbon atoms; and A_2 is an alkylene group having 2 to 5 carbon atoms; wherein the term aryl refers to phenyl or phenyl substituted with a halogen, alkyl, alkoxy, trifluoromethyl, nitro or amino group; alkyl and alkoxy refer to groups having 1 to 6 carbon atoms; and cycloalkyl refers to a group having 3 to 7 carbon atoms.

4,053,472

2-(5-NITRO-2-IMIDAZOLYL)-BENZIMIDAZOLES

Clemens Rufer; Eberhard Schroder, and Hans-Joachim Kessler, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

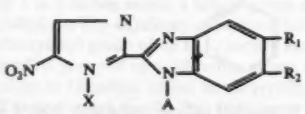
Continuation-in-part of Ser. No. 29,705, April 17, 1970, abandoned. This application Sept. 11, 1972, Ser. No. 287,852

Claims priority, application Germany, Apr. 19, 1969, 1920635

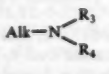
Int. Cl.² C07D *403/04, 405/14*

U.S. Cl. 544—139 **14 Claims**

1. A 2-(5-nitro-2-imidazolyl)-benzimidazole of the formula



wherein R_1 and R_2 each are hydrogen, halogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, nitro, trifluoromethyl or carboxy; A is hydroxyalkyl of 2 to 5 carbon atoms or an acyl ester thereof of an alkanoic acid of up to 12 carbon atoms or of a physiologically acceptable benzoic or naphthoic acid of up to 12 carbon atoms which is unsubstituted or monosubstituted by lower n-alkyl, lower n-alkoxy, hydroxy or amino, disubstitued by lower n-alkyl, lower n-alkoxy or monoamino-mono-hydroxy or tri-substituted by lower n-alkyl or lower n-alkoxy, haloalkyl of 2 to 5 carbon atoms, or aminoalkyl of the formula



wherein Alk is alkyl of 2 to 5 carbon atoms and R_3 and R_4 each are alkyl of 1 to 5 carbon atoms, or, together with the N-atom, pyrrolidino, piperidino, homopiperidino, piperazino, morpholino, or one of said heterocyclic groups substituted on a ring carbon atom by alkyl of 1 to 5 carbon atoms, or piperazino substituted on the 4-position nitrogen atom by piperazino substituted on the 4-position nitrogen atom by alkyl of 1–5 carbon atoms, hydroxyalkyl of 2–5 carbon atoms or an alkanoyloxy ester thereof of 1–5 carbon atoms; and X is alkyl of 1 to 5 carbon atoms; or a physiologically acceptable salt thereof.

4,053,473

PHARMACOLOGICALLY ACTIVE THIOUREA AND UREA COMPOUNDS

Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

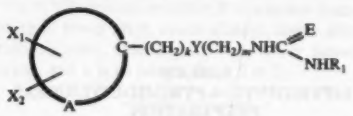
Division of Ser. No. 451,333, March 14, 1974, Pat. No. 3,950,353, which is a continuation-in-part of Ser. No. 290,584, Sept. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 230,451, Feb. 29, 1972, abandoned. This application Dec. 5, 1975, Ser. No. 638,005

Claims priority, application United Kingdom, Mar. 9, 1975, 6352/71; July 22, 1971, 34334/71; Aug. 8, 1972, 37015/72; Ireland, Feb. 3, 1972, 136/72

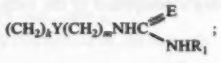
Int. Cl.² C07D *241/04*

U.S. Cl. 260—250 BN **8 Claims**

1. A compound of the formula:



wherein A is such that there is formed together with the carbon atom shown an unsaturated heterocyclic nucleus, said unsaturated heterocyclic nucleus being a pyrimidine, pyrazine or pyridazine ring; X_1 is hydrogen, lower alkyl, hydroxyl, trifluoromethyl, benzyl, halogen, amino or



X_2 is hydrogen or when X_1 is lower alkyl, lower alkyl or halogen; *k* is 0 to 2 and *m* is 2 or 3, provided that the sum of *k* and *m* is 3 or 4; Y is oxygen, sulphur or NH; E is oxygen or sulphur; and R_1 is hydrogen, lower alkyl, benzoyl or di-lower alkylamino-lower alkyl or a pharmaceutically acceptable addition salt thereof.

4,053,474

PYRAZOLO[4,3-E][1,2,4]TRIAZOLO[4,3-C]PYRIMIDINE

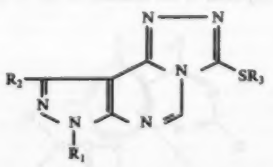
Uwe D. Treuner, and Hermann Breuer, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Apr. 21, 1976, Ser. No. 678,832

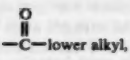
Int. Cl.² A61K *31/415;* C07D *487/14, 401/14, 403/14*

U.S. Cl. 260—256.5 R **10 Claims**

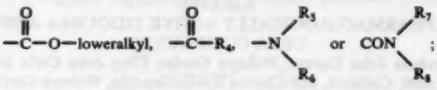
1. A compound of the formula



wherein R_1 and R_2 each is hydrogen or lower alkyl; R_3 is hydrogen, alkali metal, alkaline earth metal,



lower alkyl or mono-substituted lower alkyl wherein the lower alkyl substituent is hydroxy, cyano, phenyl,



R_4 is lower alkyl or phenyl;

R_5 and R_6 each is hydrogen or lower alkyl; and R_7 and R_8 each is hydrogen or lower alkyl.

4,053,475

N-[2-(PYRIDINYL)-4-PYRIMIDINYL]UREAS PREPARATION

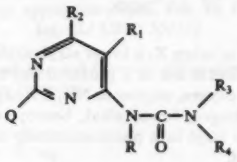
George Y. Lesher, Rensselaer, and Baldev Singh, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 556,213, March 7, 1975, Pat. No. 4,008,235. This application July 12, 1976, Ser. No. 704,519

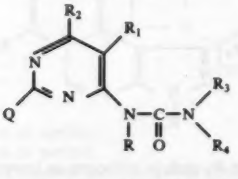
Int. Cl.[2] C07D *401/04;* A61K *31/17, 31/44*

U.S. Cl. 260—256.4 N 3 Claims

1. The process for preparing a compound of the formula



where Q is 4- or 3- or 2-pyridinyl or 4- or 3- or 2-pyridinyl having one or two lower-alkyl substituents or N-oxide thereof, R is hydrogen or lower-alkyl, R_1 is hydrogen, lower-alkyl or cyano, R_2 is hydrogen or lower-alkyl, R_3 is hydrogen, lower-alkyl or lower-hydroxyalkyl, R_4 is hydrogen, lower-alkyl, lower-hydroxyalkyl, lower-alkenyl or lower-cycloalky, which comprises reacting a 2—Q—4—RNH—5—R_1—6—R_2-pyrimidine with 1,1'-carbonyldiimidazole to produce N—(2—Q—5—R_1—6—R_2—4—pyrimidinyl)-N-R-imidazole-1-carboxamide and then reacting said 1-carboxamide with R_3R_4NH to produce a compound of the formula



where R_3 and R_4 have the meanings given above.

4,053,476

7-AZA-6-ALKOXY-1-TETRALONES

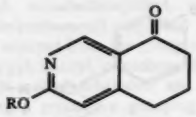
Robert J. Chorvat, Arlington Heights, and Raphael Pappo, Skokie, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 543,027, Jan. 22, 1975, Pat. No. 4,012,391, which is a continuation-in-part of Ser. No. 467,217, May 6, 1974, Pat. No. 4,007,192, which is a continuation-in-part of Ser. No. 596,509, Aug. 16, 1975, Pat. No. 3,994,774. This application Aug. 9, 1976, Ser. No. 712,449

Int. Cl.[2] C07D *217/24*

U.S. Cl. 260—289 D 2 Claims

1. A compound of the formula



wherein R represents alkyl having 1 to 4 carbon atoms.

4,053,477

5-(1,1-DIPHENYL-3-(4-PHENYLPIPERIDINO)PROPYL)-2-METHYL-1,3,4-OXADIAZOLE AND RELATED COMPOUNDS

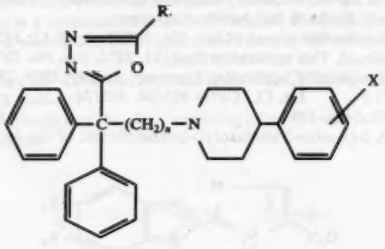
Chung H. Yen, Skokie, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed Sept. 20, 1976, Ser. No. 724,790

Int. Cl.[2] C07D *413/10*

U.S. Cl. 260—293.67 3 Claims

1. A compound of the general formula



wherein R is an alkyl radical containing from 1 to 4 carbon atoms, X is hydrogen, halo or an alkyl radical containing from 1 to 4 carbon atoms and *n* is a positive integer from 1 to 3.

4,053,478

2,5-DI-SUBSTITUTED 4-OXAZOLEALKANOIC ACIDS AND ESTERS

Tsutomu Yamanaka; Toshihiro Kobayakawa, both of Fukuoka; Mitsuhiro Konishi, Oita, and Kuniki Ikeda, Fukuoka, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

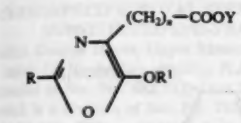
Division of Ser. No. 557,692, March 12, 1975, Pat. No. 4,012,412. This application Dec. 8, 1976, Ser. No. 748,450

Claims priority, application Japan, Mar. 13, 1974, 49-29548; Mar. 13, 1974, 49-29549; Mar. 13, 1974, 49-29550

Int. Cl.[2] C07D *413/04, 413/12;* A61K *31/42, 31/44*

U.S. Cl. 260—295 R 4 Claims

1. A compound of the formula:



wherein R^1 represents an alkyl group having 1 to 4 carbon atoms; *n* represents an integer of 1 to 2; R represents a mono- or di-substituted phenyl group (in which the substituents are selected from the group consisting of a halogen atom and a nitro group), a pyridyl group, a halogen-substituted pyridyl group, a furyl group, a halogen-substituted furyl group, a naphthyl group or a halogen-substituted naphthyl group; and Y represents a hydrogen atom or pyridylmethyl group, with the proviso that when R is not pyridyl group or halogen-substituted pyridyl group, Y can only be pyridylmethyl.

4,053,479

CERTAIN 3-ALKOXYISOTHIAZOLE-4-CARBOXYLIC ACIDS AND DERIVATIVES THEREOF

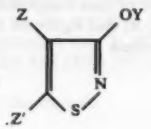
George A. Miller, Glenside, and Sheldon N. Lewis, Willow Grove, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 855,048, Sept. 3, 1969, Pat. No. 3,957,808. This application Feb. 20, 1976, Ser. No. 659,814

Int. Cl.[2] C07D *275/02*

U.S. Cl. 260—302 A 5 Claims

1. A compound of the formula



wherein

Y is an alkyl group of 1 to 18 carbon atoms; a cycloalkyl group of 3 to 8 carbon atoms; a benzyl group; a halogen-, (C_1–C_4)alkyl-, or (C_1–C_4)alkoxy-substituted benzyl group; a carbalkoxyalkyl group of up to 12 carbon atoms; a dialkylaminoalkyl group of up to 12 carbon atoms; a haloalkyl group of up to 12 carbon atoms; an alkoxyalkyl group of up to 12 carbon atoms; an alkylthio alkyl group of up to 12 carbon atoms; an alkenyl group of up to 12 carbon atoms; or an alkynyl group of up to 12 carbon atoms;

Z is a cyano group, a carboxy group, a carbalkoxy group of up to 8 carbon atoms, or carbamoyl group; and

Z′ is hydrogen, halogen or a (C_1–C_4)alkyl group; and the salts thereof with a strong acid.

4,053,480

1-THIADIAZOLYL-5-PHENOXY- AND PHENYLTHIOALKANOYLOXY IMIDAZOLIDINONES

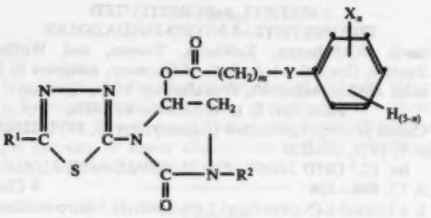
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Apr. 26, 1976, Ser. No. 679,954

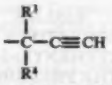
Int. Cl.[2] C07D *417/00*

U.S. Cl. 260—306.8 D 8 Claims

1. A compound of the formula



wherein R^1 is selected from the group consisting of lower alkyl, cycloalkyl of from 3 to 7 carbon atoms, lower alkenyl, lower haloalkyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl and lower alkylsulfinyl; R^2 is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl and



wherein R^3 and R^4 are each selected from the group consisting of hydrogen and alkyl of up to 3 carbon atoms; *m* is an integer from 1 to 3; Y is oxygen or sulfur; X is selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, lower alkylthio, chlorine, bromine, fluorine, lower haloalkyl, nitro and cyano; and *n* is an integer from 0 to 3.

4,053,481

2-ARYL-3,4-DIPHENYLISOXAZOLIN-5-ONES

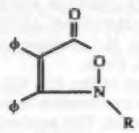
John B. Hill, Woodstock, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 540,497, Jan. 13, 1975, abandoned. This application Aug. 31, 1976, Ser. No. 719,478

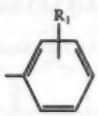
Int. Cl.[2] C07D *261/12*

U.S. Cl. 260—307 A 6 Claims

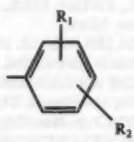
1. A compound of the formula



wherein R is a group of the formula



wherein R_1 is halogen or alkyl having 1–5 carbon atoms inclusive or a group of the formula



wherein R_1 is halogen and R_2 is alkyl having 1–5 carbon atoms inclusive.

4,053,482

1-METHYL-2-(SUBSTITUTED THIOMETHYL)-5-NITRO-IMIDAZOLES

Erhardt Winkelmann, Kelkheim, Taunus, and Wolfgang Raether, Dreieichenhain, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Apr. 7, 1976, Ser. No. 674,429

Claims priority, application Germany, Apr. 9, 1975, 2515522; Apr. 9, 1975, 2515515

Int. Cl.[2] **C07D** *233/94, 405/12, 409/12;* **A61K** *31/415*

U.S. Cl. 548—336 **4 Claims**

1. 1-Methyl-2-(5-nitro-furyl-2-thiomethyl)-5-nitro-imidazole.

2. 1-Methyl-2-(5-nitro-thienyl-2-thiomethyl)-5-nitro-imidazole.

3. 1-Methyl-2-(methoxy-thiocarbonyl-thiomethyl)-5-nitro-imidazole.

4,053,483

DERIVATIVES OF 3,3-BIS-(4-HYDROXYPHENYL)-2-INDOLINONE AND PROCESS FOR THE PREPARATION THEREOF

Alfonso Hosta Pujol, and Salvador Brosa Rabassa, both of Barcelona, Spain, assignors to Doctor Andreu S.A., Spain

Filed May 1, 1975, Ser. No. 573,406

Claims priority, application Spain, May 18, 1974, 426436

Int. Cl.[2] **C07D** *209/34*

U.S. Cl. 260—325 R **4 Claims**

1. A compound selected from the group consisting of 3,3-bis-(4-sulphoxyphenyl)-7-methyl-2-indoline, and the alkali metal or alkaline earth metal salts thereof.

4. 3,3-bis-(4-oxicarboethoxyphenyl)-7-methyl-2-indolinone.

4,053,484

1-BENZOYL-3-(4,5,6,7-TETRAHYDROBENZO[b]THIEN-4-YL)UREAS AND 1-BENZOYL-3-(4,5,6,7-TETRAHYDRO-7-OXOBENZO[b]THIEN-4-YL)UREAS, NOVEL INTERMEDIATES FOR THE PREPARATION OF ANIMAL GROWTH PROMOTING AGENTS

Goro Asato, Titusville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 532,449, Dec. 13, 1974, abandoned, which is a continuation-in-part of Ser. No. 436,827, Jan. 25, 1974, abandoned. This application June 1, 1976, Ser. No. 691,801

Int. Cl.[2] **C07D** *333/16;* **A01N** *9/00*

U.S. Cl. 260—332.3 P **6 Claims**

1. *d*l-1-Benzoyl-3-(4,5,6,7-tetrahydrobenzo-[*b*]-thien-4-yl)urea.

4. *d*l-1-Benzoyl-3-(4,5,6,7-tetrahydro-7-oxobenzo[*b*]thien-4-yl)urea.

4,053,485

TRICYCLIC PROSTAGLANDIN INTERMEDIATES

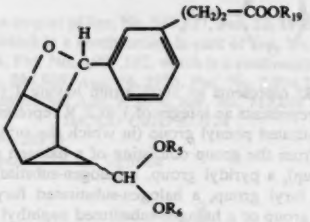
Douglas R. Morton, Jr., Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 604,159, Aug. 13, 1975, Pat. No. 3,997,566, which is a continuation-in-part of Ser. No. 552,707, Feb. 24, 1975, abandoned, which is a continuation-in-part of Ser. No. 488,295, July 12, 1974, abandoned. This application July 26, 1976, Ser. No. 708,407

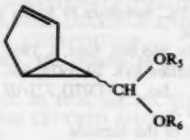
Int. Cl.[2] **C07D** *319/04*

U.S. Cl. 260—340.7 **2 Claims**

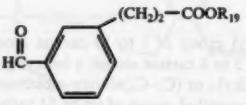
1. A process for preparing an optically active compound of the formula



or a racemic mixture of that compound and the enantiomer thereof, wherein R_{19} is hydrogen or alkyl of one to 4 carbon atoms, inclusive; wherein R_5 and R_6 taken together are $—CH_2C(CH_3)_2-CH_2—$; and wherein ~ indicates attachment to the cyclopropane ring in endo or configuration configuration, which comprises reacting an optically active compound of the formula

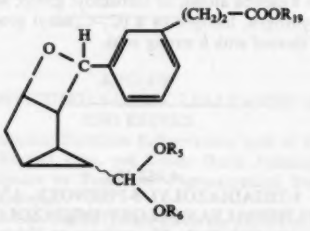


or a racemic mixture of that compound and the enantiomer thereof, wherein , R_5 and R_6 are as defined above, with a compound of the formula



wherein R_{19} is as defined above.

2. An optically active compound of the formula



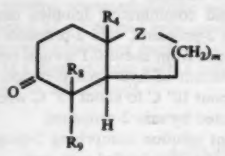
or a racemic mixture of that compound and the enantiomer thereof, wherein R_{19} is hydrogen or alkyl of one to 4 carbon atoms, inclusive; wherein R_5 and R_6 taken together are $—CH_2C(CH_3)_2-CH_2—$; and wherein ~ indicates attachment to the cyclopropane ring in endo or exo configuration.

4,053,486
STEREOSPECIFIC TOTAL STEROIDAL SYNTHESIS VIA SUBSTITUTED C/D-TRANS INDANONES

Zoltan George Hajos, Upper Montclair, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 482,711, June 24, 1974, Pat. No. 3,984,473, which is a division of Ser. No. 765,023, Oct. 4, 1968, Pat. No. 3,897,460.. This application July 14, 1976, Ser. No. 705,235
Int. Cl.[2] C07D *309/06*; C07C *143/68*
U.S. Cl. 260—345.9 S 1 Claim

1. A compound of the formula



wherein Z is $CH(OR_2)$; R_2 tetrahydropyranyl, benzoyl, nitrobenzoyl, carboxylower alkanoyl, carboxy-benzoyl or camphorsulfonyl; R_4 is hydrogen or lower alkyl; *m* is an integer having the value of 1 or 2; R_8 is hydrogen and R_9 is methylene-X, where X is lower-alkylarylsulfonyloxy, arylsulfonyloxy or lower alkylsulfonyloxy,

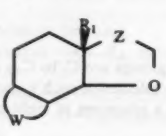
its optical enantiomer and the racemate thereof.

4,053,487
15-OXAANDROSTANES AND 15-OXOPREGNANES

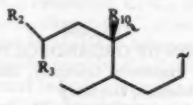
Perry Rosen, North Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 528,115, Nov. 29, 1974, Pat. No. 3,987,066, which is a division of Ser. No. 217,956, Jan. 14, 1972, Pat. No. 3,872,076. This application July 2, 1976, Ser. No. 702,244
Int. Cl.[2] C07D *307/92*
U.S. Cl. 260—346.71 7 Claims

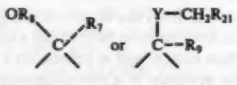
1. A compound of the formula



wherein R_1 is lower alkyl of from 1 to 5 carbon atoms; W is



where R_2 is hydrogen; R_3 is a 3-hydroxymethylene, 3-lower alkanoyloxymethylene, 3-carbonyl or 3-carbonyl-Δ^4 group; R_{10} is hydrogen or methyl; and Z is one of the groups carbonyl, di(lower alkyl)ketal, 1,2-ethylene ketal, 1,3-propylene ketal, 2,3-butylene ketal, 1,2-phenylene ketal, lower alkyl-substituted-1,2-phenylene ketal, 1,2-naphthalene ketal, 2,3-naphthalene ketal,



where Y is carbonyl or

R_7 is hydrogen, lower alkyl, lower alkenyl or lower alkynyl; R_8 is hydrogen, lower alkyl, lower cycloalkyl, lower alkanoyl or benzoyl; R_9 is hydrogen, hydroxy, or lower alkanoyloxy; R_{20} is hydroxy or lower alkanoyloxy; and R_{21} is hydrogen, hydroxy, lower alkanoyloxy or halogen.

4,053,488
SEPARATION OF 1,5-DINITROANTHRAQUINONE AND 1,8-DINITROANTHRAQUINONE

Hilmar Bruenemann, Ludwigshafen; Heinz Eilingsfeld, Frankenthal, and Dietrich Lach, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Sept. 16, 1976, Ser. No. 723,915
Claims priority, application Germany, Oct. 11, 1975, 2545699
Int. Cl.[2] C07C *76/00*; C09B *1/00*
U.S. Cl. 260—369 9 Claims

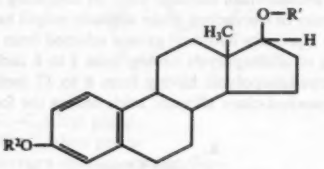
1. A process for separating 1,5-dinitroanthraquinone and 1,8-dinitroanthraquinone which comprises heating a dinitroanthraquinone mixture, in a mixture of (a) from 5 to 85 percent by weight of N-methylpyrrolidone and (b) from 95 to 15 percent by weight of at least one aromatic benzenehydrocarbon, aromatic chlorohydrocarbon, aromatic-aliphatic ether, aromatic-aliphatic ketone, monohydric aliphatic alcohol of 3 to 10 carbon atoms, alkanediol of 2 or 3 carbon atoms, aliphatic carboxylic acid of 2 to 6 carbon atoms or mixtures thereof, the boiling points of the respective constituents of (b) being from 80° to about 210° C and said constituents (b) being miscible in all proportions with N-methylpyrrolidone, at from 60° to 180° C and when the solution equilibrium has been reached, separating the undissolved material from the liquid phase at the extraction temperature.

4,053,489
OESTRATRIENE DIETHERS

Pierre Charles Wirth, 23, rue Francois 1er, Paris 8eme, France

Continuation of Ser. No. 473,313, May 24, 1974, abandoned, which is a continuation of Ser. No. 242,138, April 7, 1972, abandoned. This application Feb. 11, 1976, Ser. No. 657,381
Claims priority, application United Kingdom, Apr. 21, 1971, 10496/71
Int. Cl.[2] C07J *1/00*
U.S. Cl. 260—397.5 7 Claims

1. a compound of the formula



wherein R^1 is a methyl or ethyl group and R^2 is an alkyl group having 3 to 5 carbon atoms.

4,053,490
PROCESS FOR PRODUCTION OF AMMONIUM N[4]-ACETYSULFANILYLCYANAMIDE

John Edson Gordon, Martinsville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Nov. 26, 1976, Ser. No. 745,500
Int. Cl.[2] C07C *143/80*
U.S. Cl. 260—397.7 R 17 Claims

1. A process for the preparation of a highly pure, concen-

trated aqueous solution of ammonium N^4-acetylsulfanilylcyanamide in good yield which comprises:

a. vigorously contacting an essentially neutral aqueous mixture of an alkali or alkaline earth metal salt or mixtures thereof of N^4-acetylsulfanilylcyanamide with an inorganic acid and a solution of a water-immiscible organic solvent containing a high molecular weight, aliphatic amine, acid-binding extractant to form a two-phase mixture consisting of an organic phase and an aqueous phase, the amount of said acid being at least equal to the number of moles of acid-binding sites in said amino extractant and the amount of said alkali or alkaline earth metal salt of N^4-acetylsulfanilylcyanamide being sufficient to convert from about 70% to 100% of said acid-binding sites to an amine salt of N^4-acetylsulfanilylcyanamide,

b. separating the aqueous phase therefrom and vigorously contacting the organic phase with a dilute queous alkali in an amount essentially equal to the number of moles of acid-binding sites in said amine extractant not bound to N^4-acetylsulfanilylcyanamide,

c. separating the aqueous phase therefrom and vigorously contacting the organic phase with ammonium hydroxide in an amount substantially equal to the molecular equivalents of said alkali or alkaline earth metal salt of N^4-acetylsulfanilylcyanamide used, and

d. recovering the aqueous phase therefrom comprising ammonium N^4-acetylsulfanilylcyanamide in good yield and purity.

4,053,491

BRANCHED-CHAIN ALIPHATIC ESTER OILS

Karlheinz Koch, Haan, Rhineland, and Hermann Kroke, Erkrath-Unterbach, both of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf, Germany

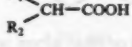
Continuation-in-part of Ser. No. 428,887, Dec. 27, 1973, abandoned. This application Aug. 7, 1975, Ser. No. 602,825

Claims priority, application Germany, Jan. 22, 1973, 2302918

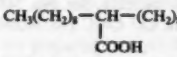
Int. Cl.² C09F 5/08; C10M 1/24

U.S. Cl. 260—410.6 **10 Claims**

1. A branched-chain aliphatic ester oil consisting essentially of a full ester of a branched-chain aliphatic polyol having only from 2 to 6 primary hydroxyl groups selected from the group consisting of alkanepolyols having from 3 to 6 carbon atoms and alkoxyalkanepolyols having from 6 to 12 carbon atoms with α-branched-chain alkanoic acids having the formula



wherein R_1 and R_2 are straight-chained alkyl having from 1 to 19 carbon atoms and the total number of carbon atoms in the acid is from 14 to 22, said acids being selected from the group consisting of (1) acids derived from the oxidation of α-branched alcohols formed from normal alcohols by the Guerbet synthesis and (2) an acid of the formula



4,053,492

EXTRACTION OF OIL FROM OATS

John Roger Brooke Boocock, Kingston, and Richard Walton Oughton, Odessa, both of Canada, assignors to Du Pont of Canada Ltd., Montreal, Canada

Filed Feb. 2, 1976, Ser. No. 654,162

Claims priority, application United Kingdom, Feb. 6, 1975, 5056/75

Int. Cl.² C11B 1/10

U.S. Cl. 260—412.4 **3 Claims**

1. A process for the extraction of oil from comminuted dehulled oats comprising the steps of:

a. extracting oil from said comminuted dehulled oats by treating said oats with 2-propanol, said 2-propanol containing a minor amount of from about 0.1 weight percent to about 1.0 weight percent of hydrogen peroxide, at a temperature of from about 10° C to about 75° C whereby oil in the oats in extracted by said 2-propanol,

b. separating the resultant solution comprising 2-propanol and extracted oil from the thus deoiled oats, and

c. separating the oil from the 2-propanol.

2. The process of claim 1 in which the 2-propanol contains less than 1% by weight of hydrogen peroxide.

3. The process of claim 1 in which the temperature of the 2-propanol during said extraction is in the range of from 10° C to 40° C.

4,053,493

LAYERED TETRAALKYL PHOSPHONIUM CLAYS

Alexis A. Oswald, Moutainside, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 402,465, Oct. 1, 1973, Pat. No. 3,929,849. This application Dec. 29, 1975, Ser. No. 644,810

The portion of the term of this patent subsequent to Dec. 30, 1992, has been disclaimed.

Int. Cl.² C07F 5/06

U.S. Cl. 260—448 C **30 Claims**

1. Tetra-alkyl phosphonium clays of the formula

$$[R_4P^+]\ Clay^-$$

wherein the four R groups are C_1 to C_{100} substituted aliphatic hydrocarbyl radicals selected in such a manner that at least one of the R groups has a minimum of eight carbon atoms.

4,053,494

PREPARATION OF ORGANOPOLYSILOXANES

Jürgen Burkhardt, Halsbach, Germany, assignor to Wacker-Chemie GmbH, Munich, Germany

Filed Aug. 16, 1976, Ser. No. 714,740

Claims priority, application Germany, Sept. 1, 1975, 2538818

Int. Cl.² C07F 7/08

U.S. Cl. 260—448.2 E **16 Claims**

1. A process for preparing an organopolysiloxane, which comprises polymerizing an organosilicon compound having the general formula

$$HO—(SiR_2O)_m—H$$

in which R is selected from the class consisting of an unsubstituted monovalent hydrocarbon radical and a substituted monovalent hydrocarbon radical and *m* represents a positive integer up to 1000, in the presence of a phosphoronitrile chloride and a hydroxyaryl compound in which one or two hydroxy groups are bonded to an aryl radical.

4,053,495
PROCESS FOR PREPARING METHYLCHLOROSILANES

Wolfgang Deinhammer; Volker Frey, both of Burghausen; Manfred Wick, Munich, and Rudolf Riedle, Burghausen, all of Germany, assignors to Consortium fur Elektrochemische Industrie GmbH, Munich, Germany

Filed Sept. 16, 1976, Ser. No. 723,871
Claims priority, application Germany, Oct. 20, 1975, 2546919
Int. Cl.² C07F 7/12
U.S. Cl. 260—448.2 E 6 Claims

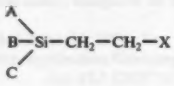
1. An improved process for preparing methylchlorosilanes by reacting tetramethylsilane with hydrogen chloride in the presence of a Friedel-Crafts catalyst, the improvement which comprises contacting tetramethylsilane with hydrogen chloride in a gaseous state with a solid Friedel-Crafts catalyst for from 1 to 100 seconds.

4,053,496
PRODUCTS FROM THE HYDROLYSIS OF β-HALOGENOETHYL-SILANES AND THEIR USE AS AGENTS FOR THE REGULATION OF PLANT GROWTH

Werner Föry, Basel; Hanspeter Fischer, Bottmingen; Dieter Lohmann, Pratteln, and Gerd Greber, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 415,081, Nov. 12, 1973, abandoned.
This application Jan. 8, 1976, Ser. No. 647,484
Claims priority, application Switzerland, Nov. 15, 1972, 16601/72
Int. Cl.² C07F 7/04, 7/18
U.S. Cl. 260—448.8 R 7 Claims

1. Partially polymerised products from the hydrolysis of beta-halogenoethylsilanes, with a degree of polymerisation of at most 3, which are obtained by hydrolysis of beta-halogenoethyl-silanes of formula I



(I)

wherein

X represents chlorine or bromine,

A represents a radical —O—R_4, chlorine or the methyl group,

B represents a radical —O—R_6 or chlorine, and

C represents a radical —O—R_8 or chlorine,

wherein the radicals

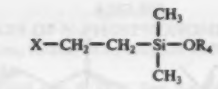
R_4, R_6 and R_8 each independently represent C_1–C_{18} alkyl; C_1–C_6 alkyl substituted by halogen; C_1–C_{18} alkyl substituted by C_3–C_{12} cycloalkyl; C_3–C_{18} alkenyl; C_3–C_{12} cycloalkenyl; C_3–C_{18} alkenyl; C_3–C_8 alkynyl or C_3–C_{12} cycloalkyl substituted by phenyl or halogen; phenyl optionally mono- or polysubstituted by C_1–C_8 alkyl or C_1–C_6 halogenoalkyl; benzyl radicals optionally mono- or polysubstituted by C_1–C_8 alkyl or halogen.

4,053,497
AGENT FOR THE REGULATION OF PLANT GROWTH

Werner Föry, Basel; Hanspeter Fischer, Bottmingen; Dieter Lohmann, Pratteln, and Gerd Greber, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 341,447, March 15, 1973, abandoned.
This application July 29, 1976, Ser. No. 709,828
Claims priority, application Switzerland, Mar. 29, 1972, 4671/72; Mar. 29, 1972, 4733/72
Int. Cl.² C07F 7/18
U.S. Cl. 260—448.8 R 6 Claims

1. A beta-halogenoethyl silane corresponding to the formula



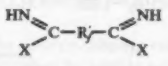
in which X is chlorine or bromine; and R_4 is C_1–C_{18} alkyl; C_1–C_{18} alkyl substituted by halogen, phenyl, or C_3–C_{12} cycloalkyl; C_3–C_{18} alkenyl; C_3–C_{18} halogenoalkenyl; C_3–C_8 alkynyl; C_3–C_{12} cycloakyl; C_3–C_{12} cycloalkenyl; phenyl; phenyl mono- or poly- substituted by C_1–C_8 alkyl, or C_1–C_6 halogenoalkyl; benzyl; or benzyl mono- or polysubstituted by C_1–C_8 alkyl or halogen.

4,053,498
PERFLUOROALKYLENE ETHER-IMIDATE AND -THIOIMIDATE ESTERS

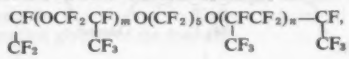
Robert C. Evers, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed July 30, 1976, Ser. No. 710,089
Int. Cl.² C07C 83/10
U.S. Cl. 260—453 RW 6 Claims

1. A compound having the following formula:



wherein X is SC_2H_5 or OCH_2CF_3; and R_f' is



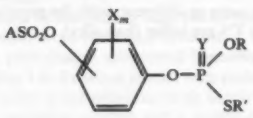
where $m + n$ equals 4 or 5.

4,053,499
O,S-DIALKYL O-SULFONYLOXYPHENYL PHOSPHOROTHIOLATES AND PHOSPHORODITHIOATES

William S. Hurt, Collegeville, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 576,838, May 12, 1975, Pat. No. 3,975,420, which is a continuation-in-part of Ser. No. 519,448, Oct. 31, 1974, abandoned. This application Apr. 26, 1976, Ser. No. 680,626
Int. Cl.² C07C 143/68; A01N 9/36
U.S. Cl. 260—456 P 8 Claims

1. A compound of the formula



wherein

R is a (C_1–C_4)alkyl group;

R′ is a (C_3–C_6)alkyl group;

Y is an oxygen atom or a sulfur atom;

X is a halogen atom, a (C_1–C_3)alkyl group, or a (C_1–C_3) alkoxy group;

m is an integer from 0 to 3; and

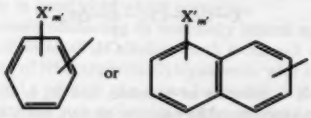
A is

a. a (C_1–C_3)alkyl group substituted with up to three halogen atoms;

b. a (C_3–C_6)cycloalkyl group;

c. a (C_7–C_{10}) unsubstituted aralkyl group, or a (C_7–C_{10}) substituted aralkyl group, the aryl portion of which is substituted with up to three nitro groups, halogen atoms, (C_1–C_3) alkyl groups, or (C_1–C_3) alkoxy groups or

d. an aryl group of the formula



wherein X' is a nitro group, a halogen atom, a (C_1-C_5)alkyl group, or a (C_1-C_5) alkoxy group; and *m'* is an integer from 0 to 3.

4,053,500

4,4,5,5-TETRADEHYDRO-ω-ARYL-PGF$_{1\alpha}$ ANALOGS

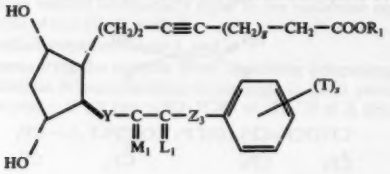
Chiu-Hong Lin, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 619,077, Oct. 2, 1975, Pat. No. 4,013,695. This application Nov. 4, 1976, Ser. No. 738,725

Int. Cl.^{2} C07C *65/22*

U.S. Cl. 560—60 **32 Claims**

1. A prostaglandin analog of the formula



wherein *g* is one, 2, or 3;
wherein Y is trans-CH=CH—:
wherein M_1 is

or

wherein R_5 is hydrogen or methyl;
wherein Z_3 is oxa or methylene, with the proviso that Z_3 is oxa only when R_3 and R_4 are hydrogen or methyl;
wherein T is chloro, fluoro, trifluoromethyl, alkyl or one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, and s is zero, one, 2, or 3, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl;
wherein L_1 is

or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro; and
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,053,501

ALKOXYCARBONYLBENZYLTRIALKYLPHOSPHONIUM SALTS

Robert K. Howe, Bridgeton, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Apr. 3, 1973, Ser. No. 347,519

Int. Cl.^{2} C07F *9/54*; A01N *9/36*

U.S. Cl. 560—103 **1 Claim**

1. The compound m-methoxycarbonylbenzyltributylphosphonium bromide.

4,053,502

4,4,5,5-TETRADEHYDRO-ω-ARYL-PGE$_1$ ANALOGS

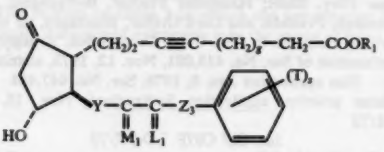
Chiu-Hong Lin, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 619,077, Oct. 2, 1975, Pat. No. 4,013,695. This application Nov. 4, 1976, Ser. No. 738,724

Int. Cl.^{2} C07C *65/22*

U.S. Cl. 560—53 **32 Claims**

1. A prostaglandin analog of the formula



wherein *g* is one, 2, or 3;
wherein Y is trans-CH=CH—;
wherein M_1 is

or

wherein R_5 is hydrogen or methyl;
wherein Z_3 is oxa or methylene, with the proviso that Z_3 is oxa only when R_3 and R_4 are hydrogen or methyl;
wherein T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, and *s* is zero, one, 2, or 3, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl;
wherein L_1 is

or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro; and
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,053,503

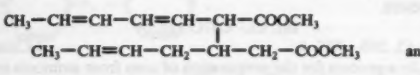
PROCESS FOR THE DIMERIZATION OF HEPTADIENE ACID ESTERS

Christian Burba, Herbern, and Peter Borner, Altluenen, both of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

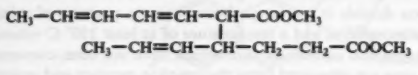
Filed Apr. 9, 1976, Ser. No. 675,460
Claims priority, application Germany, Apr. 19, 1975, 2517376
Int. Cl.² C07C 69/52
U.S. Cl. 560—202 5 Claims

1. A method for dimerizing heptadiene acid esters which comprises contacting the heptadiene acid esters at −20° C. to +120° C. with a basic catalyst selected from the group consisting of metallic lithium, sodium, and potassium, and the alcoholates, hydrides, amides, and tritylates of these metals, or contacting the heptadiene acid esters at a temperature from +20° C. to 180° C. in the presence of a basic catalyst selected from the group consisting of alcoholates, hydrides, and amides of barium and calcium.

5. An isomeric mixture consisting essentially of compounds having the formulas



and



4,053,504

STABILIZED ACRYLIC ACID ESTERS OF POLYHYDRIC ALCOHOLS AND A PROCESS FOR THEIR PREPARATION

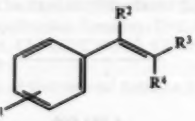
Hans Jürgen Rosenkranz; Hans Rudolph, and Gerhard Apel, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed June 14, 1976, Ser. No. 695,533
Claims priority, application Germany, June 18, 1975, 2527005
Int. Cl.² C07C 69/52
U.S. Cl. 560—4 8 Claims

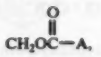
1. A composition comprising an acrylic acid ester of a polyhydric alcohol stabilized by

a. 0.01 to 0.3% by weight, based on the weight of said ester, of a stabilizer selected from the group consisting of phenols, amines, quinones, copper salts of organic acids and addition compounds of copper-I halides and phosphites and

b. 0.001 to 5% by weight, based on the weight of said ester, of a compound of the formula:



wherein R^1 is hydrogen, alkyl having 1 to 4 carbon atoms, chlorine or alkoxy having 1 to 4 carbon atoms, R^2 is hydrogen or alkyl having 1 to 4 carbon atoms and R^3 and R^4 are each hydrogen, CH_2OH, CH_2—O—A,



CHO, COOH, COO—A, $CONH_2$, CONH—A, CONH—Ar, CH_2Cl, CH_2Br or CN wherein A is alkyl having 1 to 6 carbon atoms and Ar is aryl having 6 to 15 carbon atoms.

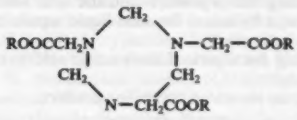
4,053,505

PREPARATION OF N-PHOSPHONOMETHYL GLYCINE

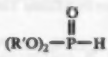
Gerard A. Dutra, Ladue, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Jan. 5, 1976, Ser. No. 646,724
Int. Cl.² C07F 9/38
U.S. Cl. 260—502.5 7 Claims

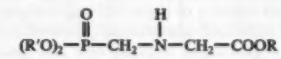
1. A process for the production of N-phosphonomethyl glycine which comprises (a) reacting a 1,3,5-tricarbohydrocarbonoxy-methyl-hexahydrotriazine of the formula



wherein R is a monovalent hydrocarbon or substituted hydrocarbon radical in which the substituent is inert to the reaction; with a phosphite ester of the formula



wherein the R′ is the same or different radical as defined for R, in the absence of a catalyst, by heating a mixture of said triazine and said ester to a temperature sufficiently elevated to initiate and maintain the reaction to form a triester of N-phosphonomethyl glycine of the formula



wherein R and R′ are as above defined, (b) hydrolyzing the triester and (c) recovering N-phosphonomethyl glycine.

4,053,506

PRODUCTION OF FIBER-GRADE TEREPHTHALIC ACID

Chang-Man Park, Naperville, Ill., and Donald G. Micklewright, Broadview Heights, Ohio, assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed May 2, 1975, Ser. No. 574,035
Int. Cl.² C07C 51/42
U.S. Cl. 260—525 7 Claims

1. In a process of recovering high purity isophthalic and/or terephthalic acid from the liquid effluent of the oxidation of meta and/or para dialkyl substituted benzene, said alkyl substituents having 1 to 4 carbon atoms, with molecular oxygen in an oxidation zone in the presence of an acetic acid solution of heavy metal oxidation catalyst and a source of bromine at an elevated temperature in the range of from 360° up to 450° F and a pressure in the reaction zone to maintain said solution in the liquid phase at said temperature, wherein said oxidation produces a liquid oxidation effluent comprising a suspension of said phthalic acid as crystalline product in the liquid acetic acid mother liquor solution of said catalyst components, by-product water, and aromatic impurities and a gaseous effluent comprising a mixture of nitrogen, oxides of carbon, water vapor, vaporized acetic acid, and small amounts of molecular oxygen; and wherein said gaseous effluent is cooled to condense water and solvent vapor therefrom and the condensate is returned to the oxidation zone as a means of controlling temperature in said reaction zone, the improvement which comprises:

1. adding fresh, hot acetic acid and small phthalic acid crystals to substantially all the orginal acetic acid mother liquor portion of the oxidation effluent at a temperature of from 50° below said oxidation temperature up to said oxidation temperature to form a new suspension of large

phthalic acid crystals in hot, fresh acetic acid and (b) the removal of the displaced acetic acid mother liquor and the small crystals suspended therein for recycle to the reaction zone;

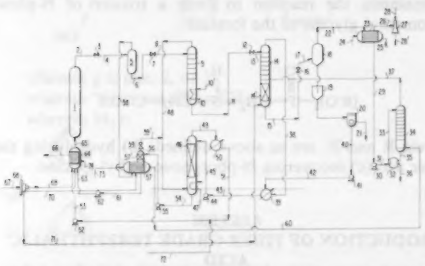
2. quenching said new suspension of crystalline phthalic acid by the addition thereto of cold, fresh acetic acid in an amount to cool the suspension to a temperature at or below the boiling point of acetic acid at atmospheric pressure;
3. depressuring said new suspension of crystalline phthalic acid in fresh acetic acid to atmospheric pressure;
4. separating the crystalline phthalic acid from the fresh acetic acid by means for solid-liquid separation at atmospheric pressure;
5. recycling the separated fresh acetic acid to the reaction zone; and
6. drying the separated crystalline product.

4,053,507

METHOD OF RECOVERING UNREACTED MATERIALS AND HEAT IN UREA SYNTHESIS

Shigeru Inoue, Kamakura, and Katsumi Kagechika, Yokohama, both of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Dec. 2, 1976, Ser. No. 746,893
Claims priority, application Japan, Dec. 5, 1975, 50-143858
Int. Cl.[2] C07C *126/02*
U.S. Cl. 260—555 A **14 Claims**



1. In a process for recovering unreacted materials and heat from a urea synthesis which includes the steps of: reacting carbon dioxide with ammonia under urea synthesis conditions to produce a urea synthesis effluent containing urea, unreacted ammonium carbamate, an excess of ammonia and water; treating said urea synthesis effluent in a plurality of pressure decomposition stages wherein the pressure is stepwise reduced thereby to decompose said ammonium carbamate into ammonia and carbon dioxide in each stage; separating a mixed gas of ammonia and carbon dioxide from said urea synthesis effluent at each decomposition stage; contacting in turn the mixed gas separated in each decomposition stage with an absorbent under substantially the same pressure as the decomposition pressure in said stage to absorb said mixed gas in said absorbent in stages; recycling the final resulting absorbate containing ammonium carbamate to the urea synthesis zone; concentrating the aqueous urea solution discharged from the final decomposition stage and still containing a small amount of ammonium carbamate thereby to obtain a concentrated aqueous urea solution; condensing water vapor generated upon said concentration to obtain a condensate containing small amounts of ammonia and carbon dioxide; and stripping said condensate to separate and recover said ammonia and carbon dioxide therefrom, the improvement which comprises absorbing the off-gas from a high pressure decomposition stage in an absorbate in a high pressure absorption zone, said absorbate being obtained by absorbing in an absorbent the off-gas from at least one medium pressure decomposition stage, recovering the heat of absorption liberated upon said absorption by an indirect heat exchange in the form of steam having a pressure of 2–4 kg/cm^2 (gauge), contacting said steam with said condensate containing small amounts of ammonia and carbon dioxide in a stripping zone to strip off substantially all of the ammonia and carbon dioxide from said condensate, and introducing the discharged steam containing the ammonia and carbon dioxide into the rectification zone of a low pressure decomposition stage to directly heat the urea synthesis effluent, thereby recovering said mixed gas separated from said urea synthesis effluent in said low pressure decomposition stage together with the ammonia and carbon dioxide contained in said steam.

4,053,508

PROCESS AND INSTALLATION FOR PREPARING UREA FROM AMMONIA AND CARBON DIOXIDE

Mathieu Bongard, Rotterdam, Netherlands, assignor to Stamicarbon, N.V., Geleen, Netherlands

Continuation-in-part of Ser. No. 135,991, Sept. 6, 1961, abandoned. This application Mar. 23, 1966, Ser. No. 547,116
Claims priority, application Netherlands, Sept. 5, 1960, 60255601
Int. Cl.[2] C07C *126/00*
U.S. Cl. 260—555 A **4 Claims**

1. In a process for the preparation of urea from ammonia and carbon dioxide in a urea synthesis zone at a pressure of at least 160 atmospheres and a temperature of at least 150° C wherein ammonia and carbon dioxide which have not been converted into urea are separated from the reaction product and recirculated back to the urea synthesis in the form of ammonium carbamate by steps including discharging the reaction mixture from the synthesis zone, expanding the thus discharged reaction mixture in a plurality of pressure stages operated at sequentially lower pressures and separating the gas and liquid phases after the expansion in each of said stages to yield a urea solution which is practically free of unreacted ammonia and carbon dioxide in the last stage, condensing the gas comprising ammonia, carbon dioxide and water from each pressure stage, the condensate formed in a lower pressure stage serving as condensation agent for the gas from a preceding pressure stage, and feeding back the condensate obtained in the first pressure stage to the urea synthesis, the improvement whereby a minimum amount of water is included in the condensate returned to said sunthesis, said improvement comprising the steps of taking the expanded gas-liquid mixture from a pressure stage and directly separating the gas and liquid phases (A) and (B), respectively, in said mixture without any application of heat thereto, thereafter heating the separated liquid phase (B) to vaporize part of the liquid therein, subjecting the resulting gas-liquid mixture to gas-liquid separation thereby obtaining gas phase (C) and liquid phase (D) and condensing the gas phases (A) and (C) obtained from both of said separations.

4,053,509

SUBSTITUTED ARYL AND ARALKYL AMIDES

Hans-Peter Faro, Munich, Germany, and Samson Symchowicz, Livingston, N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation of Ser. No. 198,974, Nov. 15, 1971, abandoned. This application Mar. 15, 1973, Ser. No. 341,624
Int. Cl.[2] C07C *103/737*
U.S. Cl. 260—557 R **3 Claims**

1. N-[β-(3,4-dihydroxyphenyl)-ethyl]-1-adamantanecarboxamide.

2. N-(3,4-difluorophenyl)-1-adamantanecarboxamide.

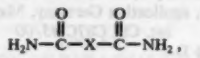
3. N-[β-(3,4-dihydroxyphenyl)-ethyl]-cyclopropanecarboxamide.

4,053,510
PROCESS FOR THE PRODUCTION OF AROMATIC AND CYCLOALIPHATIC DICARBOXYLIC ACID DIAMIDES

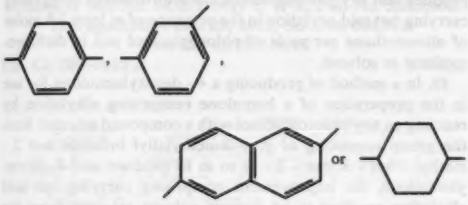
Hans Zengel, Kleinwallstadt, and Manfred Bergfeld, Erlenbach, both of Germany, assignors to Akzo N.V., Arnhem, Netherlands

Filed Dec. 30, 1974, Ser. No. 537,120
Claims priority, application Germany, Mar. 6, 1974, 2410537
Int. Cl.² C07C *102/04*
U.S. Cl. 260—557 R 9 Claims

1. A process for the production of a diamide of the formula

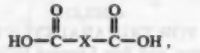


in which X is



each of which is unsubstituted or substituted by a member selected from the group consisting of alkyl of 1 to 5 carbon atoms, alkoxy of 1 to 5 carbon atoms and halogen, which process comprises:

reacting a dicarboxylic acid of the formula



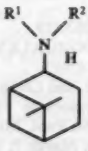
in which X has the same meaning given above, with urea at a temperature of about 60° C to 150° C in chlorosulfonic acid or an at least 10% by weight oleum as the reaction medium.

4,053,511
NOPINYLAMINES

Werner Hoffmann, Neuhofen; Norbert Mueller, Mutterstadt, and Joachim Paust, Neuhofen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Oct. 1, 1976, Ser. No. 728,528
Claims priority, application Germany, Oct. 11, 1975, 2545657
Int. Cl.² C07C *85/00, 87/00*
U.S. Cl. 260—563 P 2 Claims

1. Nopinylamines of the general formula I



I

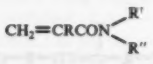
where R^1 and R^2 are identical or different and are hydrogen or alkyl of 1 to 5 carbon atoms, and the salts of these amines with mineral acids and with alkylcarboxylic acids of 1 to 4 carbon atoms.

4,053,512
PROCESS FOR PREPARING POLY(ALLYLTRIALKYLAMMONIUM) SALT FLOCCULANTS

Hans Peter Panzer, and Dinshaw Framroze Bardoliwalla, both of Fairfield County, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Aug. 2, 1976, Ser. No. 710,530
Int. Cl.² C07C *85/00*
U.S. Cl. 260—567.6 P 10 Claims

1. A process for preparing a polyquaternary flocculant which process comprises: (1) preparing a preliminary free-radical polymer of a monomer selected from (i) the group consisting of N,N-dimethylacrylamide, N,N-dimethylmethacrylamide, N-methyl, N-ethylacrylamide, N-methyl, N-ethylmethacrylamide, N, N-diethylacrylamide, N,N-diethylmethacrylamide, N-methyl, N-isopropylacrylamide, N-methyl, N-isopropylmethacrylamide, N-methyl, N-n-propylacrylamide, and N-methyl, N-n-propylmethacrylamide and (ii) mixtures thereof of a dialkylacrylamide of the structure:



wherein R is hydrogen or methyl, R′ and R″ are alkyl groups such that the number of carbons provided by R′ and R″ is from 2 to about 4, said polymer having a molecular weight of at least about 5,000; (2) reducing the amide groups of the preliminary polymer to complete absence of carbonyl absorption in the infrared so as to provide the corresponding intermediate allyldialkylamine polymer; and (3) quaternizing the intermediate polymer using a stoichiometric excess of quaternization agent to ensure complete quaternization to provide the corresponding final poly(allyltrialkylammonium) flocculant in the form of a water-soluble salt, said polymer containing a total of 3 to about 5 carbons in said trialkyl groups.

4,053,513
BARIUM NITRIDE CATALYSTS FOR THE PREPARATION OF DIAMINO-DIPHENYLMETHANES

Edward T. Marquis, and Lewis W. Watts, Jr., both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Jan. 19, 1977, Ser. No. 760,613
Int. Cl.² C07C *85/145*
U.S. Cl. 260—570 D 4 Claims

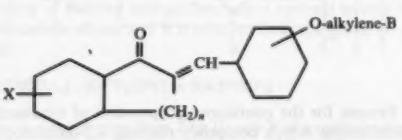
1. A method of preparing diaminodiphenylmethane and higher homologues thereof which comprises the step of condensing aniline and formaldehyde in the presence of a barium nitride catalyst.

4,053,514
2-[DIALKYLAMINOALKOXYPHENYL]-METHYLENE-2,3-DIHYDRO-1H-INDEN-1-ONES AND THE SALTS THEREOF

John Krapcho, and Joseph Schwartz, both of Somerset, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 599,732, July 28, 1975, Pat. No. 3,969,527.
This application May 3, 1976, Ser. No. 682,695
Int. Cl.² C07C *93/06*
U.S. Cl. 260—570 R 11 Claims

1. A compound of the formula



wherein X is a member selected from the group consisting of

H, halogen, alkyl of from 1 to 8 carbons, lower alkoxy or CF_3; n is 1, 2 or 3; B is a member selected from the group consisting of lower alkylamino, and dilower alkylamino; and alkylene is a straight or branched saturated hydrocarbon chain group containing from 2 to about 5 carbons; and N-oxides and pharmaceutically acceptable acid-addition salts thereof.

4,053,515

CATALYTIC HYDROGENATION OF UNSATURATED DINITRILES EMPLOYING HIGH PURITY ALUMINA

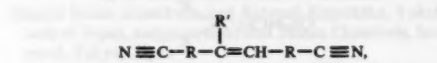
Charles A. Drake, Nowata, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 416,784, Nov. 19, 1973, Pat. No. 3,896,173, and Ser. No. 416,785, Nov. 19, 1973, Pat. No. 3,896,174. This application July 21, 1975, Ser. No. 597,616

Int. Cl.² C07C *87/14, 85/12*

U.S. Cl. 260—583 P **20 Claims**

1. A process for the catalytic hydrogenation of an unsaturated dinitrile feedstock comprising at least one unsaturated dinitrile compound of the formula



wherein each R is individually selected from the group consisting of an alkylene radical and an alkylidene radical, R′ is an alkyl radical, and the number of carbon atoms in said compound is in the range of 7 to 30; which comprises contacting said feedstock under suitable hydrogenation conditions with a secondary amine formation suppressant, hydrogen, a suitable diluent, and a supported catalyst to thereby effect the at least substantially complete hydrogenation of said at least one unsaturated dinitrile compound to the corresponding branched-chain saturated aliphatic diamine; said supported catalyst comprising a catalytic component and a catalyst support, said catalyst support consisting essentially of alumina having a purity of at least 99.5 weight percent after calcination, said catalytic component being selected from the group consisting of elemental ruthenium, elemental rhodium, elemental palladium, elemental cobalt, elemental nickel and compounds of ruthenium, rhodium, palladium, cobalt or nickel which are reducible by hydrogen to the respective elemental metal at said hydrogenation conditions.

4,053,516

PROCESS FOR THE CONTINUOUS PREPARATION OF TETRAMETHYLETHYLENE-DIAMINE

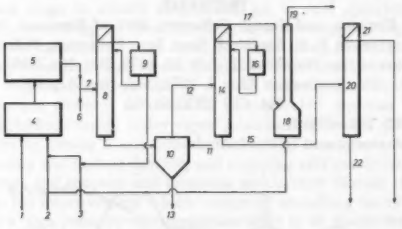
Knut Hammerstrom, Cologne, and Georg Spielberger, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 12, 1975, Ser. No. 631,260

Claims priority, application Germany, Nov. 25, 1974, 2455678

Int. Cl.² C07C *85/04*

U.S. Cl. 260—585 A **8 Claims**



1. Process for the continuous preparation of tetramethylethylenediamine which comprises reacting 1,2-dichloroethane at a temperature between 130° and 200° C and under a pressure of 80–120 bar with an excess of dimethylamine in the continuous presence of water, liberating the amines in the reaction product by treatment with bases and separating unconverted dimethylamine, treating same with water and recycling it to the reaction.

4,053,517

METHOD OF ACYLATION OF PHLOROGLUCINOL

Wolfgang Reininger, Tutzing, and Alfons Hartl, Germering, both of Germany, assignors to Atlantic Research Institute Limited, Nassau, Bahamas

Filed May 5, 1976, Ser. No. 683,318

Claims priority, application Germany, May 5, 1975, 2519990

Int. Cl.² C07C *45/00*

U.S. Cl. 260—586 D **23 Claims**

1. In a method of producing an acylphloroglucinol for use in the preparation of humulone comprising acylation of phloroglucinol in the presence of a Friedel Crafts catalyst so as to produce said acylphloroglucinol, the improvement comprising carrying out said acylation in the presence of at least 1.5 moles of nitromethane per mole of phloroglucinol and in dichloromethane as solvent.

10. In a method of producing a 4 - desoxyhumulone for use in the preparation of a humulone comprising alkylation by reacting an acylphloroglucinol with a compound selected from the group consisting of γ, γ-dimethylallyl bromide and 2 - methyl - but - 3 -ene - 2 - ol so as to produce said 4 -desoxyhumulone, the improvement comprising carrying out said alkylation reaction in an organic solvent selected from the group consisting of dioxane, methylene chloride and ether/-methylene chloride, in the presence of a weak Lewis acid catalyst selected from the group consisting of $ZnCl_2$, $POCl_3$ and acid ion exchanger.

4,053,518

PROCESS FOR TRIS(ARALKYL)PHOSPHINES

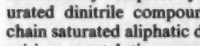
Norma Ann Weston, and Ray Leonard Hillard, both of Annandale, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 14, 1976, Ser. No. 705,314

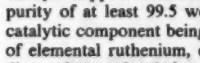
Int. Cl.² C07F *9/50, 9/54*

U.S. Cl. 260—606.5 P **11 Claims**

1. A method for the preparation of a tris(aralkyl)phosphines having the formula:



which comprises reacting, in an oxygen free environment, one molar proportion of an aralkyl halide having the formula:



wherein AR is a substituted or unsubstituted mono- or polycyclic aromatic nucleus and X is a halogen atom, with at least about 1.3 molar proportions of tris(hydroxymethyl)phosphine.

4,053,519

1,1,3,3-TETRAKIS(PERFLUOROALKYLSULFONYL)PROPANES

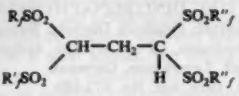
Robert J. Koshar, Mahtomedi, and Loren L. Barber, Jr., Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 556,494, March 7, 1975. This application July 12, 1976, Ser. No. 704,383

Int. Cl.² C07C *147/02*

U.S. Cl. 260—607 AL **3 Claims**

1. A substituted 1,1,3,3-tetrakis(perfluoroalkylsulfonyl)propane represented by the structure



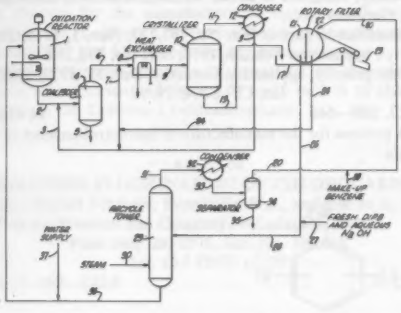
wherein R_f, R'_f and R''_f are perfluoroalkyl groups of 1–18 carbon atoms.

4,053,520

PRODUCTION OF PARA-DIALKYLBENZENE DIHYDROPEROXIDE

Glenn E. Miller, Pasadena, Tex., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 34,455, May 5, 1970, Pat. No. 3,883,600.
This application Jan. 28, 1975, Ser. No. 544,922
Int. Cl.² C07C *179/02*
U.S. Cl. 260—610 A **1 Claim**



1. A process for the recovery of a paradialkylbenzene dihydroperoxide selected from the group consisting of para-diisopropylbenzene dihydroperoxide and para-di (sec-butyl) benzene dihydroperoxide from an oxidation reaction product comprising water, dihydroperoxide, monohydroperoxide, dialkylbenzene and other oxidation reaction products, which comprises the following steps:

a. treating the oxidation reaction product to separate an aqueous phase and an organic phase,

b. treating the organic phase with a hydrocarbon stream comprising a hydrocarbon in which the dihydroperoxide is insoluble and the monohydroperoxide and dialkylbenzenes are soluble below about 85° F, which forms a minimum working azeotrope with water and which is selected from the class consisting of benzene, toluene and xylene, in a minimum ratio of hydrocarbon to organic phase of about 0.05:1,

c. cooling the organic phase-hydrocarbon mixture to a temperature below about 85° F for a time sufficient to allow the dihydroperoxide to crystallize from said organic phase-hydrocarbon mixture,

d. separating the crude solid dihydroperoxide from said organic phase-hydrocarbon mixture,

e. washing the crude solid dihydroperoxide with a hydrocarbon stream comprising the same hydrocarbon employed in step b) in a ratio of hydrocarbon to crude solid dihydroperoxide of about 1:1 to about 3:1,

f. separating the solid dihydroperoxide from the hydrocarbon wash stream of step 3) and returning said hydrocarbon to the hydrocarbon stream of step b).

4,053,521

ASYMMETRICAL HYDROGENATION BY MEANS OF OPTICALLY ACTIVE ALUMINUM HYDRIDE DERIVATIVES

Matteo Giongo, Mentana; Walter Marconi, San Donato Milanese; Nicola Palladino, Monterotondo, and Francesco Di Gregorio, Milan, all of Italy, assignors to Snam Progetti S.p.A., San Donato Milanese, Italy

Continuation of Ser. No. 460,221, April 11, 1974, abandoned.
This application May 10, 1976, Ser. No. 684,487
Claims priority, application Italy, Apr. 13, 1973, 22954/73
Int. Cl.² C07C *29/14, 29/00*
U.S. Cl. 260—618 H **3 Claims**

1. A process for asymmetrically hydrogenating acetophenone to an optically active product which comprises contacting acetophenone with N-methyl phenethylamino-alane in the presence of an organic solvent at a temperature in the range of from −100° to +150° C and thereafter subjecting the reaction mixture to hydrolysis to obtain the optically active product.

4,053,522

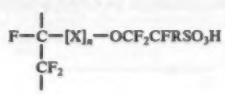
PREPARATION OF BISPHENOLS

James D. McClure, Houston, Tex., and Friedrich E. Neumann, Moraga, Calif., assignors to Shell Oil Company, Houston, Tex.

Filed May 21, 1976, Ser. No. 688,875
Int. Cl.² C07C *37/20, 39/16*
U.S. Cl. 260—619 A **7 Claims**

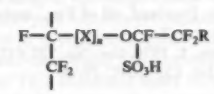
1. A process for the production of bisphenols which comprises contacting a phenol and ketone in the liquid phase at a temperature of between about 20° and about 150° C with a solid perfluorinated polymer catalyst having pendent sulfonic acid groups modified by the neutralization of between about 5 and about 50 percent of the sulfonic acid groups with a C_1–C_4 alkyl mercaptoamine wherein said solid perfluorinated polymer catalyst prior to partial neutralization contains a repeating structure selected from the group consisting of:

a)



or

b)



where n is 0, 1 or 2; R is a radical selected from the group consisting of fluorine and perfluoroalkyl radicals having from 1 to 10 carbon atoms; and X is selected from the group consisting of:

$$[O(CF_2)_m], [OCF_2CFY] \text{ or } [OCFYCF_2[$$

where m is an integer from 2 to 10 and Y is a radical selected from the class consisting of fluorine and the trifluoromethyl radical.

4,053,523

PROCESS FOR THE HYDROXYLATION OF PHENOL

Hermann Seifert, Cologne; Helmut Waldmann; Wulf Schwerdtel, both of Leverkusen, and Wolfgang Swodenk, Odenthal-Gloebusch, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 28, 1975, Ser. No. 554,048
Claims priority, application Germany, Mar. 6, 1974, 2410742
Int. Cl.² C07C *39/10*
U.S. Cl. 260—621 G 14 Claims

1. A process for preparing pyrocatechol and hydroquinone, wherein phenol is reacted at the start of the reaction with substantially anhydrous hydrogen peroxide obtained by distilling off hydrogen peroxide which is in the form of non-aqueous solution whose solvent boils at a higher temperature than the phenol, together with the phenol from the higher boiling solvent, and reacting, before or after condensation, the vapors containing hydrogen peroxide which distill over, optionally following the addition of a stabilizer, wherein the reaction is carried out in the presence of a strong acid selected from the group consisting of sulfuric acid, perchloric acid, nitric acid, trifluoromethanesulfonic acid, perfluorobutanesulfonic acid, a fluorinated acid ion exchanger of a sulfonated polymeric fluorine-substituted hydrocarbon and fluorosulfonic acid at a temperature of 20°–150° C and recovering pyrocatechol and hydroquinone.

4,053,524

HYDROGENATION PROCESS AND CATALYST

Paul R. Stapp, and Marvin M. Johnson, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 28, 1975, Ser. No. 608,599
Int. Cl.² C07C *29/20, 27/04*
U.S. Cl. 260—631 H 3 Claims

1. A process for the hydrogenation of phenol which comprises admixing said phenol and an aqueous alkaline solution diluent having an alkali concentration such that the mol ratio of alkaline agent to phenol is in the range of 0.001 to about 2 mols per mol of phenol and treating the resulting admixture with hydrogen at a temperature in the range of 75° to about 200° C. and a pressure of about 225 to about 5000 psig in the presence of from 1 to about 10 parts by weight per 100 parts by weight of said phenol of a catalyst consisting essentially of 0.1 to 1.0 weight percent ruthenium on Cr_2O_3 whereby the hydrogenation is effected.

4,053,525

PROCESS FOR PRODUCTION OF GLYCERINE

David I. Saletan, LaPorte; Reginald S. Yeung, Houston, and William R. Pledger, Pearland, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Nov. 1, 1976, Ser. No. 737,627
Int. Cl.² C07C *29/00*
U.S. Cl. 260—635 E 11 Claims

1. A process for the production of glycerine from a chlorohydrin reactant mixture containing epichlorohydrin and glycerol mono- and dichlorohydrins which comprises hydrolyzing the chlorohydrin reactant mixture at a temperature of about 50° to about 70° C by contact with an aqueous phase containing at least 0.5% by weight alkali metal carbonate catalyst in the presence of an organic solvent phase having less than about 0.5% weight solubility in water and a dielectric constant of less than about 10, said aqueous phase being about 0.5 to about 10 times the volume of the organic solvent phase, for a period of from about 20 to about 150 hours.

4,053,526

PROCESS FOR ISOLATING DINITRONAPHTHALENES

Heinz Ulrich Blank, Odenthal; Friedrich Durholz, Remscheid, and Guido Skipka, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 1, 1976, Ser. No. 672,689
Claims priority, application Germany, Apr. 19, 1975, 2517437
Int. Cl.² C07C *79/10*
U.S. Cl. 260—645 16 Claims

1. Process for isolating 1,5- and 1,8-dinitronaphthalene from mixtures of isomeric dinitronaphthalenes at least containing the same which comprises treating the mixture of isomers successively with a more polar solvent and a less polar aromatic solvent for dinitronaphtalenes thereby dissolving the mixture of isomers except for 1,5-dinitronaphthalene which remains largely undissolved in the more polar solvent, and subsequently treating the residual mixture of isomers, after removal of the more polar solvent, with a less polar aromatic solvent at elevated temperature in which **1,8-dinitronaphthalene** remains as a largely insoluble residue.

4,053,527

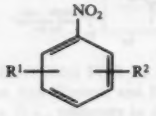
MANUFACTURE OF HALONITROBENZENES

Ulrich Jersak, and Horst Scheuermann, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Continuation-in-part of Ser. No. 737,723, Nov. 1, 1976. This application Feb. 25, 1977, Ser. No. 772,283
Claims priority, application Germany, Dec. 11, 1975, 2555736
Int. Cl.² C07C *79/12*
U.S. Cl. 260—646 14 Claims

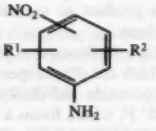
1. A process for the manufacture of halonitrobenzenes of the formula

I



where R^1 and R^2 may be identical or different and each is halogen, and R^2 may also be hydrogen, by reacting halonitroanilines with alcohols and nitrosating agents at elevated temperatures in the presence of an acid, wherein halonitroanilines of the formula

II



where R^1 and R^2 have the above meanings, are reacted with aliphatic, cycloaliphatic or araliphatic alcohols, which may be partly or wholly combined with the nitrosating agent, at not less than 35° C, in the presence of water.

4,053,528

PROCESS FOR THE PREPARATION OF DIELS-ALDER ADDUCTS OF HALOGENATED CYCLOPENTADIENES

Donald H. Thorpe, Williamsville, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 429,454, Dec. 28, 1973, abandoned. This application Apr. 9, 1975, Ser. No. 566,487
Int. Cl.² C07C *17/00*
U.S. Cl. 260—648 C 16 Claims

1. In a process for the preparation of a Diels-Alder adduct by carrying out the Diels-Alder reaction of a halogenated cyclo-

pentadiene, wherein the carbon atoms of the carbon-to-carbon double bonds are perhalogenated, with a mono-olefin or diolefin capable of reacting with said halogenated cyclopentadiene to form a solid adduct, the improvement which comprises carrying out the adduction reaction with the reactants emulsified in an aqueous reaction medium employing about 0.9 to about 2.2 mole of the halogenated cyclopentadiene per mole of the olefin, the proportion of the halogenated cyclopentadiene and olefin reactants in said aqueous emulsion being about 10 to about 60 weight percent of the emulsion and the reaction temperature being about 20° Centigrade to about 160° Centigrade to obtain the solid adduct in particulate form having substantially no particles with a maximum size greater than about 200 microns.

4,053,529

PROCESS FOR THE MANUFACTURE OF VINYLIDENE FLUORIDE

Guy Martens, Jemeppe, Belgium, assignor to Solvay & Cie, Brussels, Belgium

Filed July 13, 1976, Ser. No. 704,798

Claims priority, application Luxembourg, July 18, 1975, 73023

Int. Cl.² C07C *17/34*

U.S. Cl. 260—653.5 **5 Claims**

1. Process for the manufacture of vinylidene fluoride by pyrolysis of 1-chloro-1,1-difluoroethane at temperatures of between 500° and 610° C, comprising conducting the pyrolysis in the simultaneous presence of from 0.01 to 10 mol % of carbon tetrachloride and from 0.01 to 10 mol % of chlorine, relative to the 1-chloro-1,1-difluoroethane.

4,053,530

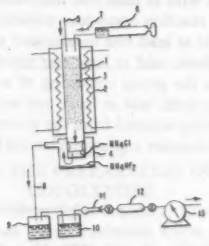
CATALYZED FLUORINATION OF CHLOROCARBONS

Wesley Gerald Schindel, Pennsville, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 29, 1976, Ser. No. 709,818

Int. Cl.² C07C *17/10*

U.S. Cl. 260—653.8 **10 Claims**



1. The process of fluorinating carbon tetrachloride or chloroform which comprises reacting, at a temperature of around 300°–550° C. and in vapor phase,

at least one of the same with ammonium bifluoride

in the presence of at least one catalyst of the group consisting of calcium, magnesium, barium, strontium, ferric and chromic fluorides and chromic phosphate.

4,053,531

STEAM REFORMING OF POLYCYCLIC HYDROCARBONS

Edwin R. Kerr; Tansukhlal G. Dorawala, both of Wappingers Falls, and Russell R. Reinhard, Hopewell Junction, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,911

Int. Cl.² C07C *3/34, 3/58*

U.S. Cl. 260—672 R **19 Claims**

1. The process for converting a charge polycyclic aromatic hydrocarbon to an aromatic product containing a lesser number of aromatic rings than said charge hydrocarbon which comprises

passing a mixture of steam and a charge polycyclic aromatic hydrocarbon at 850° F–1500° F and 0–400 psig into contact with an activated supported catalyst containing oxides of (i) a Group VIB metal, (ii) a Group I A metal, and (iii) an after-deposited Group VIII metal, said supported catalyst containing Group VIII metal, expressed as metal oxide, in amount of at least about 0.5 wt % when said Group VIII metal is a noble metal and in amount of at least about 6 wt % when said Group VIII metal is iron, cobalt, or nickel, and at least about 15% by weight of said Group VIII metal, expressed as oxide, being in the form of metal thereby forming an aromatic product containing a lesser number of aromatic rings than said charge hydrocarbon; and

recovering said product.

4,053,532

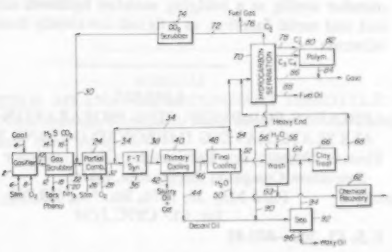
METHOD FOR IMPROVING THE FISCHER-TROPSCH SYNTHESIS PRODUCT DISTRIBUTION

Henry R. Ireland, Woodbury, and Thomas R. Stein, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 601,753, Aug. 4, 1975. This application Dec. 5, 1975, Ser. No. 638,217

Int. Cl.² C07C *1/04*

U.S. Cl. 260—676 R **5 Claims**



1. In a process for hydrodewaxing a Fischer-Tropsch decant oil fraction boiling in the range of 400° F to about 1000° F wherein the heavy oil fraction is contacted in the presence of hydrogen with a crystalline zeolite catalyst having a pore diameter greater than about 5 Angstroms; a silica-to-alumina ratio of at least 12; a constraint index within the range of 1 to 12; the method for improving the catalyst selectivity and aging rate during said operation which comprises preconditioning said catalyst by,

a. heating the catalyst gradually with hydrogen at 800° F for two hours at a pressure of about 500 psig,

b. sulfiding the hydrogen treated catalyst at a temperature within the range of 500° to 750° F.,

c. contacting the sulfided catalyst with a steam-hydrogen mixture at 800° F for 24 hours, and

d. reducing the temperature of the steam treated catalyst to about 500° F before initially contacting the oil charge therewith under hydrodewaxing conditions.

4,053,533
OXIDATION OF ACETYLENIC IMPURITIES WITH COPPER MANGANITE CATALYST

Lewis E. Drehman; Floyd Farha, Jr., and Arlo J. Moffat, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 15, 1975, Ser. No. 622,591
Int. Cl.² C07C *7/01*; B01J *23/34, 23/84*
U.S. Cl. 260—681.5 R **7 Claims**

1. A process for the selective removal of acetylenic contaminants or impurities present in hydrocarbon streams which comprises contacting oxygen and a hydrocarbon-containing mixture contaminated with acetylenic compounds with a catalyst consisting essentially of copper, manganese, and oxygen in which the atomic ratio of copper to manganese varies from about 0.25:1 to about 4:1 under oxidation conditions including a temperature and a mol ratio of oxygen to hydrocarbon sufficient to selectively remove a substantial portion of said acetylenic compounds present in said mixture.

4,053,534
ORGANIC COMPOUND CONVERSION

Thomas Owen Mitchell, Trenton, and Darrell Duayne Whitehurst, Titusville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

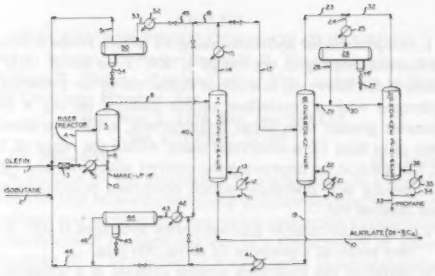
Division of Ser. No. 681,883, April 30, 1976, which is a continuation-in-part of Ser. No. 443,557, Feb. 19, 1974, Pat. No. 3,980,583. This application Dec. 27, 1976, Ser. No. 754,209
Int. Cl.² C07C *3/14*
U.S. Cl. 260—683.15 R **29 Claims**

1. A method for olefin dimerization which comprises contacting said olefin under conditions effective for dimerization with a catalyst comprised of a substrate or a porous refractory oxide, said substrate having surface hydroxyl groups, a minimum surface area of about 10 m^2/g and pores with a minimum pore diameter of about 5 Angstrom Units, said substrate being modified by at least one amine functional member, containing the element silicon, coordinated to a metal function of a transition metal selected from the group consisting of Group VIII metals of the Periodic Table of Elements, said amine functional member acting as a bridging member between said substrate and said metal function, as a ligand covalently bonded to said substrate.

4,053,535
PROCESS FOR PRODUCING ISOPARAFFIN-OLEFIN ALKYLATE HAVING IMPROVED OCTANE NUMBER

Thomas Hutson, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 25, 1976, Ser. No. 689,760
Int. Cl.² C07C *3/54*
U.S. Cl. 260—683.49 **2 Claims**



1. A process for producing alkylate having an improved octane number which comprises:
   a. passing total hydrocarbon reactants comprising isoparaffin and olefin through a static mixing zone and therein subjecting said isoparaffin and olefin to thorough mixing;
   b. introducing the mixture of isoparaffin and olefin after passing through said static mixing zone to a riser-reactor in admixture with HF acid catalyst at liquid phase and reaction conditions to convert at least a substantial portion of isoparaffin and olefin into alkylate;
   c. passing the reaction effluent of step (b) to a first settling zone and allowing the reaction effluent to separate into an upper phase comprising hydrocarbons and a lower phase comprising HF;
   d. passing said upper phase to a fractionation zone and therein subjecting same to distillation conditions to separate said upper phase into a fraction comprising alkylate and a fraction comprising isoparaffin;
   e. withdrawing the isoparaffin fraction from step (d) and refrigerating same to a sufficiently low temperature to allow separation of traces of HF still remaining in the isoparaffin fraction;
   f. passing the refrigerated isoparaffin stream to a second settling zone and allowing same to separate therein into an upper isoparaffin phase and a lower HF phase;
   g. recycling a substantially HF-free isoparaffin stream separated in (f) to said mixing zone; and
   h. withdrawing the alkylate separated in step (d) as product, said alkylate having a higher octane value than alkylate produced by the same process, but without step (a).

4,053,536
DEHYDRATION OF OLEFINICALLY UNSATURATED ALCOHOLS

William B. Hughes, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 25, 1976, Ser. No. 689,759
Int. Cl.² C07C *1/20*
U.S. Cl. 260—681 **20 Claims**

1. A process which comprises contacting at least one unsaturated alcohol with at least one molybdenum-containing compound under reaction conditions suitable to convert at least a portion of said at least one unsaturated alcohol to at least one conjugated diene, said at least one unsaturated alcohol being selected from the group consisting of α-olefinic alcohols and β-olefinic alcohols, said at least one molybdenum-containing compound being selected from the group consisting of molybdenum β-diketonates and molybdenum(II) carboxylates.

4,053,537
PROCESS FOR THE PRODUCTION OF ELASTIC COMPOSITES

Hans Dieter Ruprecht, and Paul Henrichs, both of Cologne, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 6, 1975, Ser. No. 629,346
Claims priority, application Germany, Nov. 25, 1974, 2455679
Int. Cl.² C08L *75/08*
U.S. Cl. 260—859 R **5 Claims**

1. A process for the production of an elastic composite comprising:
   a. coating rubber and/or elastomeric plastic granulates with a paste of
      i. a hydroxyl containing polyether and
      ii. mineral fillers and/or pigments,
   b. subsequently mixing a polyisocyanate binder therewith, and
   c. hardening the resultant mixture.

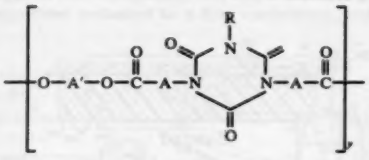
4,053,538

BLOCK POLYMERS FROM ISOCYANURATE-BASED POLYESTERS AND CONVENTIONAL POLYESTER SEGMENTS

John E. Herweh, Lancaster, and William Y. Whitmore, Hellam, both of Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Apr. 9, 1976, Ser. No. 675,453
Int. Cl.² C08L 67/00; C08G 63/68
U.S. Cl. 260—860 8 Claims

1. A substantially linear segmented copolymer having the formula $(MX)_n$ wherein n is an integer greater than 0 and M is a bivalent organic radical segment of the formula



wherein R is hydrogen, C_1 to C_4 alkyl, aryl or C_1 to C_4 alkyl substituted aryl; A is C_1 to C_4 alkylene; A′ is C_1 to C_4 alkylene the same or different from A, phenylene or alkyl substituted phenylene; and y is an integer greater than 0, said segment M of molecular weight from 1,000 to 20,000; and X is a bivalent organic radical segment of the formula

wherein G is a long chain radical segment of recurring linkages selected from the group consisting of ester and ether; and z is in integer greater than 0 the same or different than said segment X of molecular weight 1,000 to 20,000; wherein the difference between the glass transition temperature of said segment M and said segment X is from about 50° to about 200° C.

4,053,539

PROCESS FOR THE PREPARATION OF GRAFTED COPOLYMERS

Jacques Delsarte, Villers Saint Sepulcre, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Jan. 30, 1976, Ser. No. 653,948
Claims priority, application France, Feb. 3, 1975, 75.03229
Int. Cl.² C08F 255/04, 255/06
U.S. Cl. 260—878 R 15 Claims

1. A method of preparing grafted polymers by mass polymerizing a mixture of polymerizable vinyl monomers in the presence of an elastomer on which the vinyl monomers are to be grafted, the elastomer being soluble in at least one of the vinyl monomers and also insoluble in at least one of the vinyl monomers, which comprises:

a. dissolving an elastomer in at least one monomer in which it is soluble;
b. initiating a mass prepolymerization reaction;
c. introducing the monomer or monomers in which the elastomer is insoluble during the prepolymerization reaction;
d. completing the addition of the monomer or monomers during the prepolymerization reaction prior to the phase inversion of the reaction medium; and
e. completing the polymerization.

4,053,540

SELF-SEALING FILMS

Federico Argurio, Brussels; Mario Borsatti, Overijse, and Jan Heindrijckx, Berg, all of Belgium, assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 585,882, June 11, 1975, abandoned.
This application Aug. 16, 1976, Ser. No. 714,894
Claims priority, application United Kingdom, July 5, 1974, 29970/74
Int. Cl.² C08K 5/11
U.S. Cl. 260—897 B 3 Claims

1. A composition suitable for fabricating into a self-sealing film consisting essentially of

i. 95.0 to 99.9 wt. % of a mixture of thermoplastic polyethylene and a copolymer of ethylene and vinyl acetate, the copolymer containing 3 to 10 wt. % of polymerized vinyl acetate, the proportion of polymerized vinyl acetate in the mixture being from 0.10 to 1.95 wt. %; and
ii. 0.01 to 5.0 wt. % of a partial ester, the partial ester being gylcerol monooleate or a monoester of sorbitol or sorbitan and a C_{10} to C_{24} carboxylic acid.

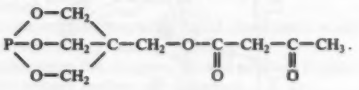
4,053,541

ACETOACETIC ACID PENTAERYTHRITE PHOSPHITE ESTER

Edgar Fischer, Frankfurt am Main; Otto Mauz, Liederbach, Taunus; Norbert Mayer, and Gerhard Pfahler, both of Augsburg, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 3, 1976, Ser. No. 654,853
Claims priority, application Germany, Feb. 7, 1975, 2505152
Int. Cl.² C07F 9/141
U.S. Cl. 260—937 1 Claim

1. Acetoacetic acid pentaerythrite phosphite ester of the formula

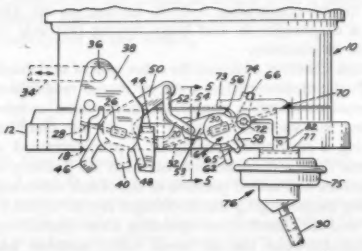


4,053,542

CONTROL MEANS FOR SECONDARY THROTTLE

John L. Niebrzydoski, Florissant, Mo., assignor to ACF Industries, Inc., New York, N.Y.

Filed July 22, 1976, Ser. No. 707,859
Int. Cl.² F02M 11/02
U.S. Cl. 261—23 A 3 Claims



1. In a multiple stage carburetor for an internal combustion engine, a primary mixture conduit having a primary throttle valve therein and a secondary mixture conduit having a secondary throttle valve therein, primary and secondary throttle shafts on which the primary and secondary throttle valves are mounted, a linkage releasably connecting the primary and secondary throttle shafts for rotation including a latch member

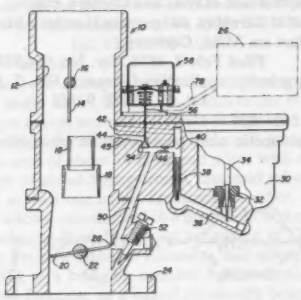
for the linkage movable to a latched position to connect the linkage for sequential opening of the secondary throttle valve; the improvement comprising a diaphragm motor operatively connected to the latch member to move the latch member to a latched position, a vacuum line connected to the diaphragm motor and in fluid communication with the intake manifold vacuum, an air bleed in the vacuum line including an air bleed valve member, and a temperature responsive bimetallic element operatively connected to the air bleed valve member to control the amount of air bled into the vacuum line, said bimetallic element responsive to a predetermined high engine operating temperature and being actuated upon reaching the desired engine operating temperature to increase the amount of air bled into the vacuum line and effect movement of the latch member to latched position to permit opening of the secondary throttle valve.

4,053,543

AIR BLEED CONTROL FOR CARBURETOR IDLE SYSTEM

James H. Pettitt, Woodhaven, Mich., assignor to ACF Industries, Inc., New York, N.Y.

Filed Oct. 31, 1975, Ser. No. 627,661
Int. Cl.[2] F02M *3/04*
U.S. Cl. 261—121 B **3 Claims**



1. In a carburetor for an internal combustion engine having a fuel bowl, an air and fuel mixture conduit, a throttle valve mounted within said conduit, an idle port in the mixture conduit adjacent the closed position of the throttle valve, an idle fuel passage between the idle port and the fuel bowl, an air bleed port in said carburetor in fluid communication with the idle fuel passage, and an air bleed valve member to control the amount of air flow through said air bleed port, the improvement of air bleed valve control means integral with said carburetor to control the movement of said valve member, said control means comprising a body having an air chamber therein, a diaphragm in said body having one side thereof facing the air chamber,

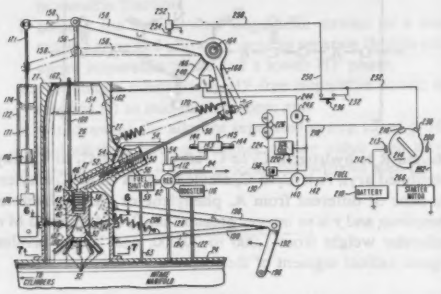
a vacuum chamber adjacent the other side of said diaphragm in fluid communication with an intake manifold of the internal combustion engine, a check valve member between the vacuum chamber and the air chamber and having a restricted opening of a predetermined size to permit fluid communication between the vacuum and air chambers in a seated position of the check valve member, spring means urging the diaphragm in a direction toward the said air chamber, an operating stem operatively connected between the air bleed valve member and diaphragm and positioned within the vacuum chamber to move with the diaphragm, said diaphragm being responsive to manifold vacuum and upon rapid engine deceleration said diaphragm and operating stem in response to the relatively large pressure differential between the said vacuum chamber and the said air chamber to move said air bleed valve member in one direction to provide maximum air flow to said idle fuel passage, said pressure differential being reduced upon the flow of air through the restricted opening in said check valve member whereby after a predetermined time said air bleed valve member moves in an opposite direction to reduce the air flow to said idle fuel passage.

4,053,544

FUEL INDUCTION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Jesse C. Moore, Celina, Ohio, assignor to J. C. Moore Research, Inc., Celina, Ohio

Filed Apr. 15, 1974, Ser. No. 460,915
Int. Cl.[2] F02M *31/14*
U.S. Cl. 261—145 **19 Claims**



1. Mechanism for introducing fuel into an internal combustion engine having an intake manifold, comprising:

a housing having a vacuum chamber in communication with the intake manifold,

a vaporizer within the vacuum chamber, the vaporizer having a vaporizer chamber and an expansion vaporizer cavity in communication with the vaporizer chamber,

a plurality of nozzles extending from the vaporizer cavity into the vacuum chamber,

a plurality of parallel aligned discs within the vaporizer chamber and extending across the vacuum chamber, each of the discs having at least one aperture therethrough,

a fuel conduit in communication with the vaporizer chamber,

a metering rod having a portion axially movable within the fuel conduit and axially movable to close the fuel conduit, the metering rod having a groove extending along a portion of the length thereof, the groove having a gradually increasing dimension along the length thereof,

fuel pump means joined to the fuel conduit for urging flow of fuel therethrough,

and control means for controlling the axial position of the metering rod with respect to the fuel conduit to control the volume of fuel which flows through the fuel conduit to the vaporizer chamber.

4,053,545

PROCESS FOR MANUFACTURING LAMINATED STRUCTURAL FOAM ARTICLES

Clifford Charles Fay, St. Paul, Minn., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation of Ser. No. 464,543, April 26, 1974, abandoned.
This application July 29, 1975, Ser. No. 599,984
Int. Cl.[2] B29D *27/00*; B32B *5/18*
U.S. Cl. 264—46.4 **4 Claims**

1. A process for preparing a laminated article comprising a thermoplastic sheet bonded to and supported by a thermoplastic foam which comprises: introducing by injection a foamable thermoplastic resin composition into a mold containing a thermoplastic sheet preheated to a first temperature, said thermoplastic sheet having substantially the contours of at least a portion of a surface of said mold and being fitted to said por-

tion of a surface of said mold, said foamable thermoplastic resin being at a second temperature such that said foamable thermoplastic resin composition foams in said mold and a thermal bond at the interface is created between the resulting thermoplastic foam and said thermoplastic sheet by facial melting of said thermoplastic sheet caused by said foam, wherein said first and second temperatures are selected such as to result in substantially the same linear shrinkage of said thermoplastic foam and said thermoplastic sheet upon cooling the resultant laminate to room temperature.

2. A process for preparing a laminated article comprising a thermoplastic sheet bonded to and supported by a thermoplastic foam which comprises: introducing by injection a foamable thermoplastic resin composition into a mold containing a thermoplastic sheet preheated to a first temperature, said sheet

being provided with a coating of a heat activated adhesive on at least a portion of a first surface and said sheet having a second surface to be contacted with said foamable thermoplastic resin composition opposite said first surface with substantially the contours of at least a portion of a surface of said mold and having said second surface fitted to said portion of a surface of said mold, said foamable thermoplastic resin being at a second temperature such that said foamable thermoplastic resin composition foams in said mold and a bond is created between the resulting thermoplastic foam and said thermoplastic sheet upon reaction of said adhesive caused by the heat of said foamable thermoplastic resin composition, said first and second temperatures being selected so as to result in substantially the same linear shrinkage of said thermoplastic sheet and said thermoplastic foam upon cooling the resultant laminate to room temperature.

4,053,546

METHOD OF MAKING A LEATHER-LIKE SHEET MATERIAL BY COAGULATING TWO POLYMERS

Tsuyoshi Yamasaki, and Kunio Kogame, both of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Dec. 24, 1975, Ser. No. 644,120
Claims priority, application Japan, Dec. 25, 1974, 49-4082
Int. Cl.² B29D *27/04*; B05D *5/00*
U.S. Cl. 264—49 **4 Claims**

1. A method for producing a leather-like sheet material having a good sponge structure and low bounce impact elasticity, which comprises,

a. preparing a composite solution by mixing (i) a solvent solution of a polymer (A) consisting mainly of an elastomer having an initial modulus of less than 5×10^2 Kg/cm² and (ii) a dispersion in a liquid dispersing medium of a polymer (B) consisting mainly of an elastomer having an initial modulus of less than 5×10^2 Kg/cm² and having a particle size less than 5μ, said said solvent for (A) not completely dissolving (B), thereby resulting polymer (B) being dispersed but not completely dissolved in said composite solution, the ratio of (A) to (B) being in the range of 95 : 5 to 30 : 70 parts by weight;

b. coating a supporting sheet in a given thickness or impregnating a fibrous mat with the composite solution;

c. immersing the coated supporting sheet or the impregnated fibrous mat in a liquid coagulation bath for coagulating said polymers (A) and (B); thereby depositing and coagulating said polymers on said supporting sheet or in said fibrous mat; and sheet or said;

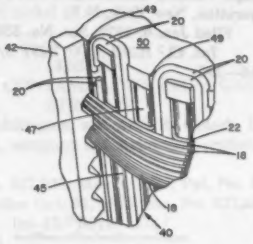
d. drying said sheet or said mat.

4,053,547

METHOD FOR PRODUCING A POSITIVE DRIVE BELT

John D. Redmond, Jr., Littleton, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Division of Ser. No. 189,440, Oct. 14, 1971, Pat. No. 3,772,929.
This application June 21, 1973, Ser. No. 372,124
Int. Cl.² B29D *29/02*
U.S. Cl. 264—102 **19 Claims**



1. A method for casting cog-type power transmission belts from flowable elastomeric material comprising the steps of:

a. forming a mold cavity defined by a mold mandrel and an outer mold shell, one of said mandrel or shell having a plurality of notches therein disposed substantially parallel to the axis of the mold;

b. wrapping an extensible fabric about the surface of the notched mold portion;

c. placing loading members upon the extensible fabric and positioned opposite of and extending in the same direction as said notches;

d. forcing said loading members and the extensible fabric ahead of the loading into the bottom members of said notches;

e. introducing a substantially liquid elastomeric material into said mold cavity; and

f. polymerizing the resultant formed product to form one or more unitary endless belt members.

4,053,548

FABRICATION PROCESS FOR MULTIPHASED PLASTICS

Robert D. Lundberg, Somerville, and Henry S. Makowski, Scotch Plains, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Nov. 17, 1971, Ser. No. 199,799
Int. Cl.² B29B *3/02*; B29C *25/00*
U.S. Cl. 264—230 **7 Claims**

1. A process for fabricating an article from a thermoplastic composition, said thermoplastic composition being a multiphase copolymer of the A-B-A,

or $(AB)_n$ type, wherein n is greater than 1 and wherein polymer blocks, A and B, are thermoplastic resins, each comprising at least 10 monomer units and having softening points of at least 35° C., with B being the lower softening block and being present in at least about 50% to about 97% by weight % of the total polymer, and the A block having a softening point at least 10° C. higher than said B block which comprises:

a. forming said thermoplastic composition in a first desired shape at a temperature above both softening points;

b. reforming to a second desired shape the formed thermoplastic of step (a) at a temperature between that of the softening point of the A and B blocks; and

c. cooling the reformed thermoplastic to a temperature

below both softening points while retaining said new desired shape.

4,053,549

METHOD OF EMBOSSING FOAM POLYSTYRENE TO PREVENT WARPING UPON REMOVAL FROM MOLD

Robert Joseph Vandor, Canandaigua, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 6, 1975, Ser. No. 538,660
Int. Cl.[2] B29B 3/00; B29F 5/00
U.S. Cl. 264—293 3 Claims

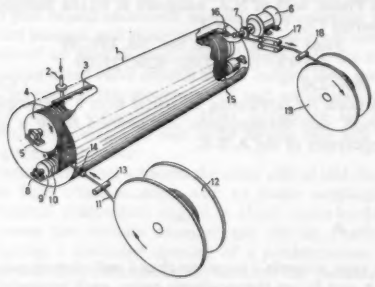
1. In a method of thermoforming a flat foam polystyrene sheet to make a substantially flat article free from integral upstanding wall elements by preheating a flat polystyrene sheet and embossing one side said sheet by pressing said sheet between a pair of mold members, the improvement to eliminate warpage of said article upon removal of said article from said mold members, comprising: forming, by surface embossing at least two spaced apart parallel grooves in a surface of a second side only of the preheated said sheet.

4,053,550

VULCANIZATION METHOD

Challen E. Taylor, Portadown, Northern Ireland, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 506,386, Sept. 16, 1974, abandoned. This application Mar. 8, 1976, Ser. No. 664,606
Claims priority, application United Kingdom, Oct. 29, 1973, 50138/73
Int. Cl.[2] B29H 5/01
U.S. Cl. 264—347 3 Claims



1. A method of vulcanizing continuous lengths of unsheathed and unvulcanized elastomeric or plastomeric hose comprising feeding in the absence of significant tension a continuous length of such hose without internal support in a helical path around a pair of rolls mounted on horizontal axis in a vulcanizing chamber, the surface of at least one of said rolls being contoured to position the convolutions of hose thereon and one of said rolls being of a substantially larger diameter than and mounted above and spaced from the other roll so that a substantial portion of the length of the hose is free of any contact with the roll surfaces and also self-supporting, providing sufficient pressure and temperature within said chamber to cause vulcanization of the elastomeric or plastomeric material and driving one of said rolls to continuously feed the hose through said vulcanizing chamber in said helical path from one end of the chamber to the other whereby the length of hose is vulcanized as it passes through said chamber.

4,053,551

METHODS OF RECOVERING TERBIUM OXIDE FROM A GLASS

James E. Brug, Toledo, Ohio, and Eric X. Heidelberg, Lambertville, Mich., assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Sept. 2, 1976, Ser. No. 719,769
Int. Cl.[2] C01F 17/00
U.S. Cl. 423—21 6 Claims

1. A method of recovering Tb_4O_7 from a glass containing terbium oxide, the method comprising the steps of:

I. fusing the glass containing SiO_2, Li_2O, Al_2O_3 and terbium oxide with NaOH to provide a solid fusion product;

II. slurrying in water the fusion product of Step I to disperse solid particles of Tb_4O_7 and Li_2SiO_3 and dissolving the Al_2O_3, NaOH and Na_2SiO_3 to thereby separate said Al_2O_3, NaOH and Na_2SiO_3 from the solid particles of Tb_4O_7;

III. reacting the solid particles of Tb_4O_7 separated from the slurry of step II with HNO_3 to provide $Tb(NO_3)_3$;

IV. reacting $Tb(NO_3)_3$ with oxalic acid to form $Tb_2(C_2O_4)_3$; and

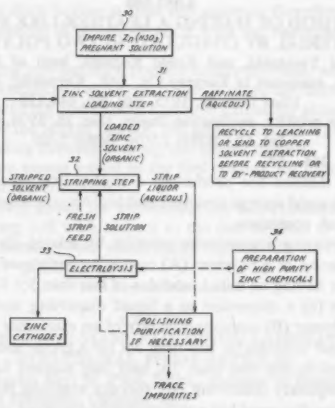
V. firing $Tb_2(C_2O_4)_3$ to form Tb_4O_7 and CO_2 to thereby recover solid Tb_4O_7.

4,053,552

SOLVENT EXTRACTION OF ZINC FROM SULFITE-BISULFITE SOLUTION

Jay B. Clitheroe, Salt Lake City, Utah, and Robert Brantley Sudderth, Tucson, Ariz., assignors to General Mills Chemicals Co., Tucson, Ariz. and Mineral & Chemical Resource Co., Houston, Tex.

Filed Mar. 15, 1976, Ser. No. 666,694
Int. Cl.[2] C01G 9/00
U.S. Cl. 423—100 8 Claims



1. In a process for hydrometallurgical purification of zinc, the steps consisting essentially of:

forming an aqueous feed solution containing zinc values and a concentration of available bisulfite ions stoichiometrically in excess of the concentration of all metal values in said feed solution;

contacting said aqueous feed solution with an organic phase containing an ion exchange reagent selected from the group consisting of organo acid phosphates at a pH of from about 4.5 to about 1.5, whereby the pH of said con-

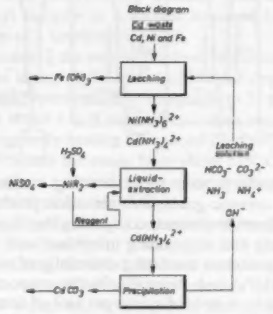
tacting step is maintained throughout extraction within said pH range and at least a portion of said zinc values are extracted into said organic phase;

and, contacting said organic phase with an inorganic mineral acid strip solution, thereby stripping said zinc values from said organic stage into said strip solution.

4,053,553
METHOD FOR SELECTIVE RECOVERY OF CADMIUM FROM CADMIUM-BEARING WASTE

Hans Reinhardt, Vastra Frolunda; Harald Daniel Ottertun, Molndal, and Jan Helge Arnold Rydberg, Vastra Frolunda, all of Sweden, assignors to Nife Jungner AB, Oskarshamn, Sweden

Filed Jan. 14, 1976, Ser. No. 648,999
Claims priority, application Sweden, Jan. 28, 1975, 7500877
Int. Cl.² C01G *11/00, 51/04, 53/10*
U.S. Cl. 423—105 **6 Claims**



1. A method for the selective recovery of cadmium, nickel and cobalt from a nickel-cadmium battery waste which comprises:

a. leaching the waste with an ammoniacal carbonate solution wherein the sum of ammonia and ammonium ions ranges from 1 to 10 molar and the sum of hydrogen carbonate ions and carbonate ions ranges from 0.2 to 5 molar, thus forming an aqueous ammoniacal carbonate solution containing cadmium, nickel and cobalt(II) ammine complexes and a leaching residue, wherein any iron in the waste remains in the undissolved leaching residue;

b. adding air to the aqueous ammoniacal carbonate solution from step (a) to thereby oxidize the cobalt (II) ammine complex to cobalt (III) ammine complex;

c. contacting the resulting aqueous ammoniacal carbonate solution with an organic solution substantially insoluble in water which contains a hydroxyoxime with which nickel forms a nickel compound readily soluble in the organic solution, but which does not affect cadmium and cobalt (III) in the aqueous ammoniacal carbonate solution to thereby remove nickel therefrom;

d. precipitating the cadmium in the form of a carbonate by removing ammonia from the aqueous ammoniacal carbonate solution and removing said cadmium in the form of a carbonate;

e. withdrawing a portion of the aqueous ammonicacal carbonate solution resulting from step (d) after the precipitation of cadmium as a carbonate and precipitating the cobalt from the thus withdrawn solution by the removal of ammonia therefrom;

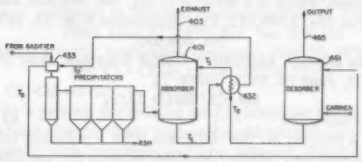
f. returning the ammonia resulting from step (e) to the aqueous ammoniacal carbonate solution which has been freed from cadmium in step (d) and replacing the loss of carbonate ions due to any precipitations by the addition of carbon dioxide in gaseous form, whereafter the resulting aqueous ammoniacal carbonate solution is reused in the leaching of step (a);

g. stripping the nickel compound readily soluble in the organic solution generated in step (c) by washing the organic solution with an aqueous solution of sulphuric acid containing 10 – 800 g/l of free sulphruic acid, whereby the nickel is stripped into the aqueous solution in the form of nickel sulphate, and thereafter reusing the organic solution stripped of nickel in step (c).

4,053,554
REMOVAL OF CONTAMINANTS FROM GASEOUS STREAMS

Richard S. Reed, Millington, and Alan R. Glueck, Lawrenceville, both of N.J., assignors to Catalox Corporation, Millington, N.J.

Division of Ser. No. 467,938, May 8, 1974, Pat. No. 3,917,797. This application Oct. 31, 1975, Ser. No. 627,655
Int. Cl.² B01D *53/34*
U.S. Cl. 423—210.5 **9 Claims**



1. The method of removing hydrogen sulfide from a mixture of gases comprising the steps of:

a. passing the mixture of gases through an absorber;

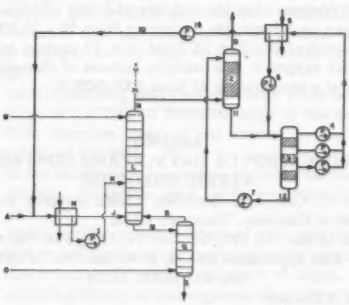
b. contacting the mixture of gases with a molten salt complex of vanadium oxide and alkali metal compound in said absorber at a temperature in the range from about 500° to about 700° F to absorb the hydrogen sulfide;

c. recovering said mixture of gases from said absorber absent said hydrogen sulfide.

4,053,555
REMOVAL OF NITROGEN OXIDES FROM INDUSTRIAL GASES BY USE OF OXIDIZING SOLUTIONS IN WHICH NITRATES ARE THE OXIDANTS

Donald W. Bolme, c/o Donald W. Bolme & Associates, 10655 NE. 4th St., Bellevue, Wash. 98004

Continuation-in-part of Ser. No. 259,402, June 5, 1972, abandoned. This application Feb. 7, 1975, Ser. No. 548,104
Int. Cl.² B01D *53/34*
U.S. Cl. 423—235 **19 Claims**



1. A method of removing the sparingly soluble compound

nitric oxide from industrial waste gases comprising an admixture of said nitric oxide and at least one other gas which includes the steps of: oxidizing the nitric oxide to the soluble trivalent state by so contacting it with an aqueous, nitrate ion containing solution as to effect the reaction

$$2NO + NO_3^- + H_2O \rightarrow 3NO_2^- + 2H^+;$$

and dissolving the trivalent material in the water present in said solution to thereby separate the trivalent material from said gases; the concentration of nitrate ion in said solution being maintained in the range of 1–11.5 normal during the aforesaid steps to inhibit the decomposition of the dissolved trivalent material and the oxidation of the nitric oxide past the trivalent state, thereby maximizing the separation of the nitric oxide from the admixture.

4,053,556
CATALYSIS

Gary James Keith Acres, London, England, assignor to Johnson, Matthey & Co., Limited, London, England

Continuation-in-part of Ser. No. 617,161, Sept. 26, 1975, abandoned, which is a division of Ser. No. 262,363, June 13, 1972, Pat. No. 3,909,452. This application Mar. 18, 1976, Ser. No. 668,035

Claims priority, application United Kingdom, June 16, 1971, 28283/71; June 16, 1971, 28314/71

Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—239 **13 Claims**

1. In a process for the reduction with a reducing fuel of an oxide of nitrogen which comprises passing the gas mixture at an elevated temperature through a supported catalyst, the improvement which comprises using as the supported catalyst, one consisting essentially of an inert rigid porous refractory honeycomb structure having a first coating thereon containing at least one oxide selected from the group constituted by the oxides of titanium, zirconium, hafnium and thorium and a second coating of a mixture or alloy of platinum, rhodium and base metal in which the rhodium constitutes from 1 to 50 weight % and the base metal constitutes from 0.01 to 25 weight % of the total metal content.

4,053,557
METHOD OF DECOMPOSING CHLOROHYDROCARBONS

Yoichi Kageyama, Yokohama, Japan, assignor to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Division of Ser. No. 469,804, May 14, 1974, Pat. No. 3,972,979. This application Jan. 8, 1976, Ser. No. 647,565

Claims priority, application Japan, May 14, 1973, 48-53292; May 29, 1973, 48-60107

Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—240 **6 Claims**

1. A method of oxidatively decomposing a chlorohydrocarbon having from 1 to 10 carbon atoms to carbon dioxide, water, hydrogen chloride and free chlorine which comprises contacting an exhaust gas containing from 10 – 10,000 ppm of said chlorohydrocarbon of from 1 – 10 carbon atoms and molecular oxygen with a catalytic amount of chromium oxide catalyst at a temperature of from 200°–500° C.

4,053,558
PURIFICATION OF GAS STREAMS CONTAINING FERRIC CHLORIDE

Ramsey G. Campbell, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 595,464, July 14, 1975, Pat. No. 4,000,205. This application Dec. 6, 1976, Ser. No. 747,677

Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—240 **5 Claims**

1. A process for removing ferric chloride from a gaseous stream containing the same by passing said stream through a bed comprising activated alumina impregnated with a member selected from the group consisting of potassium chloride and sodium chloride.

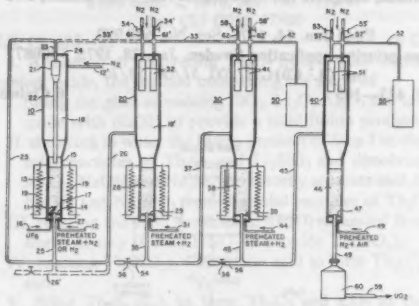
4,053,559
PRODUCTION OF URANIUM DIOXIDE

James E. Hart, Columbia, S.C.; David L. Shuck, Littleton, Colo., and Ward L. Lyon, Monroeville, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 14, 1976, Ser. No. 695,346

Int. Cl.[2] C01G *43/02*; G21C *3/00*

U.S. Cl. 423—261 **8 Claims**



1. A continuous process for converting uranium hexafluoride (UF_6) to ceramic-grade uranium oxide product having a low residual fluoride content, comprising the steps of:

a. establishing and maintaining in contact with a first fluidized bed a mixture consisting essentially of uranium hexafluoride (UF_6) and steam (H_2O) the proportion of from about in 2 to 8 mols of steam per mol of uranium;

b. concurrently heating the first fluidized bed to a temperature within the range from about 475° C to about 600° C to produce a first intermediate reaction product including solid particles of uranyl fluoride (UO_2F_2) and the oxide U_3O_8 and an off-gas including hydrogen fluoride (HF);

c. conveying the first solid intermediate reaction product to a second fluidized bed reactor;

d. controlling the mole fraction of hydrogen fluoride in the second reactor to minimize the formation of uranium tetrafluoride UF_4;

e. maintaining the second fluidized bed comprising a mixture of the first solid intermediate reaction product and additional steam and hydrogen in the proportions of from about 4 to 12 mols of steam and from about 1 to 6 mols of hydrogen per mol of uranium;

f. concurrently heating the second fluidized bed to a temperature within the range from about 575° C to about 675° C to produce a second intermediate reaction product including uranium dioxide (UO_2);

g. conveying the second intermediate reaction product to a third fluidized bed;

h. maintaining the third fluidized bed comprising a mixture of the second intermediate reaction product and additional steam and hydrogen in the proportions of from about 2 to 11 mols of steam and from about 0.5 to 6 mols of hydrogen per mol of uranium;

i. concurrently heating the third fluidized bed to a temperature within the range from about 575° C to about 675° C to produce a third intermediate reaction product consisting essentially of uranium dioxide (UO_2) having an oxygen-uranium ratio of about 2 and a low residual fluoride content;

j. conveying the third intermediate reaction product to a fourth fluidized bed; and

k. maintaining the fourth fluidized bed comprising the third intermediate reaction product and a mixture of air and nitrogen to further reduce the fluoride content and in-

crease the oxygen-uranium ratio to about 2.2 to about 2.3 to produce ceramic-grade uranium oxide product suitable for use in the manufacture of fuel pellets for nuclear reactors.

6. A continuous process for converting uranium hexafluoride (UF_6) to ceramic-grade uranium dioxide (UO_2) having low residual fluoride content, comprising the steps of:

a. establishing and maintaining in contact with a first fluidized bed a mixture cnsisting essentially of uranium hexafluoride, steam (H_2O) and hydrogen (H_2) in the proportions of from about 2 to 8 mols of steam and from about 1 to 8 mols of hydrogen per mol of uranium;

b. concurrently heating the first fluidized bed to a temperature within the range from about 475° C to about 600° C to produce a first intermediate reaction product including solid uranyl fluoride (UO_2F_2) and an off-gas including hydrogen fluoride (HF);

c. diverting the off-gas from the first reactor including the hydrogen fluoride to a gas scrubber system and conveying the solid intermediate reaction product including the uranyl fluoride to a second fluidized bed reactor using steam as a transport medium;

d. maintaining the second fluidized bed comprising a mixture of the uranyl fluoride and additional steam and hydrogen in the proportions of from about 4 to 12 mols of steam and from about 1 to 6 mols of hydrogen per mol of uranium;

e. concurrently heating the second fluidized bed to a temperature within the range from about 575° C to about 675° C to produce a second intermediate reaction product including uranium dioxide (UO_2);

f. conveying the second intermediate reaction product to a third fluidized bed;

g. maintaining the third fluidized bed comprising a mixture of the second intermediate reaction product and additional steam and hydrogen in the proportions of from about 2 to 11 mols of steam and from 0.5 to 6 mols of hydrogen per mol of uranium;

h. concurrently heating the third fluidized bed to a temperature within the range from about 575° C to about 675° C to produce a third intermediate reaction product consisting essentially of uranium dioxide (UO_2) having an oxygen-uranium ratio of about 2 in a low residual fluoride content;

i. conveying the third intermediate reaction product to a fourth fluidized bed; and

j. maintaining the fourth fluidized bed comprising the third intermediate reaction product and a mixture of air and nitrogen to further reduce the fluoride content and increase the oxygen-uranium ratio to about 2.25 to produce ceramic-grade uranium dioxide suitable for use in the manufacture of fuel pellets for nuclear reactors.

4,053,560

FLAME RETARDANT

Albert Y. Garner, Yellow Springs, Ohio, assignor to Monsanto Research Corporation, St. Louis, Mo.

Division of Ser. No. 490,609, July 22, 1974, Pat. No. 3,955,029. This application Nov. 17, 1975, Ser. No. 632,540

Int. Cl.[2] C01B *21/00, 21/10*

U.S. Cl. 423—302 **1 Claim**

1. A product comprising $Cl_3P{=}N{-}N{=}PCl_3$ reacted with anhydrous ammonia in excess over that required to combine with all the chlorine atoms.

4,053,561

REMOVAL OF FLUORINE FROM PHOSPHATIC SOLUTIONS

Mazin R. Irani, Tarrytown, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 14, 1975, Ser. No. 604,572

The portion of the term of this patent subsequent to Nov. 23, 1992, has been disclaimed.

Int. Cl.[2] C01B *15/16, 25/26, 25/16*

U.S. Cl. 423—313 **16 Claims**

1. A method for removing fluoride ions from phosphoric acid comprising the steps of neutralizing said acid to a pH between about 5 and about 9, separating precipitated impurities, contacting the neutral salt solution thereby formed with an insoluble alkaline earth metal phosphate salt, and separating the neutral salt solution.

4,053,562

PRODUCTION OF ALKALI METAL PHOSPHATE SOLUTIONS OF LOW VANADIUM CONTENT

Heinz Harnisch, Cologne-Lovenich; Klaus-Peter Ehlers, Erftstadt-Lechenich, and Klaus Schrödter, Cologne, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed June 22, 1976, Ser. No. 698,332

Claims priority, application Germany, June 28, 1975, 2528895

Int. Cl.[2] C01B *15/16, 25/26, 25/16*

U.S. Cl. 423—313 **3 Claims**

1. In a process for making alkali phosphate solutions of low vanadium content from wet-processed phosphoric acids contaminated with vanadium and iron, wherein the acids containing vanadium and iron in the highest stage of oxidation are treated with a reductant to effect conversion of the vanadium and iron comtaminants to a lower stage of oxidation, the resulting acids are neutralized by means of an alkaline liquor or alkali metal carbonate or mixture thereof down to a pH of a least 3, and the resulting precipitate is separated, the improvement which comprises using the sodium salt of hydroxymethanesulfinic acid as the reductant.

4,053,563

HYBRID PHOSPHORIC ACID PROCESS

Robert L. Somerville, Rte. 1, Box 256, Old Amwell Road, Neshanic, N.J. 08853

Continuation of Ser. No. 630,363, Nov. 10, 1975, abandoned, which is a continuation of Ser. No. 511,315, Oct. 1, 1974, abandoned, which is a continuation of Ser. No. 320,087, Jan. 2, 1973, abandoned. This application July 23, 1976, Ser. No. 708,077

Int. Cl.[2] C01B *25/16*

U.S. Cl. 423—320 **3 Claims**

1. A method of producing phosphoric acid 45–50% P_2O_5 content which comprises establishing two processes for the manufacturing of phosphoric acid,

1. a first gypsum process and

2. a second hemihydrate process, each producing product phosphoric acid and each having a product stage, filtration stages including wash stages and means for recycling acid,

a. interconnecting said two processes from the product stage of the first to filtration stage of the second and from filtration stage of the second to the recycling means of the first, and

b. in the simultaneous operation thereof, reacting, in each process, phosphate rock with concentrated sulfuric acid,

c. passing said reaction mixture of rock and said sulfuric acid to a filtration stage in each process wherein filtration is accomplished in a sequence of stages,

d. removing filtrate in said sequence of stages of said filters and employing first filtrate product from the first stage of said sequence of stages of said first process as wash acid for the second stage of said sequence of stages of

filtration in said second process and simultaneously employing a third stage filtrate from said second process as recycle acid in said first process.

4,053,564

EXTRACTION PROCESS FOR PURIFICATION OF PHOSPHORIC ACID

James L. Bradford, Brea, and Fernando Ore', Whittier, both of Calif., assignors to Occidental Petroleum Company, Los Angeles, Calif.

Filed May 20, 1976, Ser. No. 688,265
Int. Cl.[2] C01B *25/16*
U.S. Cl. 423—321 S **18 Claims**

1. A process for the purification of phosphoric acid which comprises:

a contacting an aqueous phosphoric acid phase containing from 1% to about 55% P_2O_5 by weight and dissolved ionic metallic impurities selected from the group consisting of calcium, magnesium, aluminum and iron (II and III) with an organic extractant phase comprising a water immiscible organic solent containing at least one water immiscible organic sulfonic acid having at least 12 carbon atoms and at least one water immiscible mono- or di-substituted organic acid phosphate, phosphonate, or half-ester thereof dissolved therein to form:

i. a purified phosphoric acid phase; and

ii. a loaded organic extractant phase containing ionic metallic impurities extracted from said aqueous phosphoric acid and selected from the group consisting of calcium, magnesium, aluminum and iron (II and III) and P_2O_5 values, and

b. separating the loaded organic extractant phase from the purified aqueous phosphoric acid phase.

4,053,565

SILICA XEROGELS

Jerome H. Krekeler, Cincinnati, Ohio; William Kirch, Clinton, Iowa, and Henri A. Aboutboul, Brussels, Belgium, assignors to National Petro Chemicals Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 294,270, Oct. 10, 1972, abandoned, Ser. No. 326,645, Jan. 26, 1973, abandoned, Ser. No. 311,579, Dec. 4, 1972, abandoned, and Ser. No. 383,203, July 27, 1973, abandoned, said Ser. No. 294,270, is a continuation of Ser. No. 70,622, Aug. 14, 1970, abandoned, which is a continuation-in-part of Ser. No. 750,733, Aug. 6, 1968, Pat. No. 3,652,214, Ser. No. 750,734, Aug. 6, 1968, Pat. No. 3,652,215, and Ser. No. 766,693, Oct. 11, 1968, Pat. No. 3,652,216, said Ser. No. 326,645, is a continuation of Ser. No. 148,117, May 28, 1971, abandoned, which is a division of Ser. No. 750,734, , said Ser. No. 311,579, is a continuation of Ser. No. 122,502, March 9, 1971, abandoned, which is a continuation of Ser. No. 750,467, Aug. 6, 1968, abandoned, said Ser. No. 383,203, is a continuation of Ser. No. 122,503, March 9, 1971, abandoned, which is a division of Ser. No. 750,467,. This application Jan. 28, 1974, Ser. No. 437,274
Int. Cl.[2] C01B *33/16*
U.S. Cl. 423—338 **2 Claims**

1. A silica xerogel having the following characteristics:

a. a nitrogen pore volume greater than 1.96 cc/g. and up to 2.90 cc/g., said pore volume being equal to the volume of the pores in said gel having pore diameters of up to 600 A and being determined as that volume of nitrogen adsorbed by and condensed in the pores of said gel per gram of the dry gel at the normal boiling point of liquid nitrogen and at a relative pressure P/Po equal to 0.967 wherein P is the pressure of the nitrogen vapor over the gel and Po is the vapor pressure of liquid nitrogen;

b. the major portion of said nitrogen pore volume being provided by pores having pore diameters within the range of from 300–600 A; and

c. a surface area within the range of from 200–500 m^2/g.

4,053,566

METHOD OF MAKING DIAMMONIUM HYDRAZINIUM TETRAPERCHLORATE

Theodore C. Crawford, Yuma, Ariz., assignor to Thiokol Corporation, Newtown, Pa.

Filed Sept. 30, 1975, Ser. No. 618,017
Int. Cl.[2] C01B *21/20, 21/52*
U.S. Cl. 423—386 **9 Claims**

1. A method of making diammonium hydrazinium tetraperchlorate which comprises reacting an ammonium compound selected from the ammonium halide, ammonium hydroxide and ammonium perchlorate and a hydrazinium compound selected from the hydrazinium halides and hydrazinium hydroxide with perchloric acid in an aqueous perchloric acid solution containing from about 60% to 70% by weight of perchloric acid to form diammonium hydrazinium tetraperchlorate and recovering the diammonium hydrazinium tetraperchlorate from said solution.

4,053,567

ALUMINUM AND MAGNESIUM PERCHLORATE-HYDRAZINE COMPLEXES

Gerhard Franz, Toms River, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Apr. 21, 1965, Ser. No. 450,576
Int. Cl.[2] C01B *21/20*
U.S. Cl. 423—386 **16 Claims**

1. A compound of the formula

$$Al(ClO_4)_3 \cdot [Mg(ClO_4)_2]_x \cdot yN_2H_4$$

wherein x is a member selected from the group consisting of 0 and 1, y is a member selected from the group consisting of 6 and 8 and when x is 0, y is 6; when x is 1, y is 8.

2. The compound $Al(ClO_4)_3 \cdot 6N_2H_4$

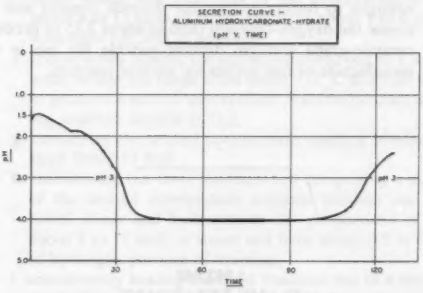
3. The compound $Al(ClO_4)_3 \cdot Mg(ClO_4)_2 \cdot 8N_2H_4$

4,053,568

PROCESS FOR THE PREPARATION OF ANTACID ALUMINUM HYDROXYCARBONATE HYDRATE

Rolf Hermann Heinrich Madaus, Cologne-Bruck, and Klaus Gorler, Bensberg-Refrath, both of Germany, assignors to Dr. Madaus & Co., Cologne, Germany

Filed Mar. 28, 1975, Ser. No. 563,416
Claims priority, application Germany, May 4, 1974, 2421703
Int. Cl.[2] C01B *31/24;* A01N *11/00;* A61K *33/10;* C01F *7/02*
U.S. Cl. 423—419 P **17 Claims**



1. Process for the preparation of basic aluminum hydroxycarbonate hydrate which comprises simultaneously adding aqueous solutions of aluminum sulfate and alkali metal hydrogen carbonate or carbonate to water while maintaining an initial pH-value of from 6.8 to 7.8, permitting the resulting precipitation to run to completion, and then in a subsequent step, adding an aluminum salt of a strong acid to adjust the pH-value of the reaction mixture to about 6.0.

4,053,569

UPGRADING COAL FOR COKING PURPOSES

Hans Helmut Hahn, 38 Marais St., Bailey's Muckleneuk, Pretoria, South Africa

Filed June 15, 1976, Ser. No. 696,221

Claims priority, application South Africa, June 20, 1975, 75/3956

Int. Cl.[2] C01B *31/02;* C01C *1/00;* C10B *53/04, 55/02*

U.S. Cl. 423—445 12 Claims

9. Coke, being the product of carbonisation under coke-oven conditions of a blend of between 50 and 99% by weight (mass) of coal and between 1 and 50% by weight (mass)of an additive comprising a pitch-like, high-boiling fraction or distillation residue boiling above 270° C of a tar formed as a by-product of the pressure-gasification of coal in the presence of steam and oxygen to yield a gas comprising carbon monoxide, hydrogen and carbon dioxide.

4,053,570

ALUMINUM HALOHYDRATE

George G. Merkl, 46 Sunset Court, Haworth, N.J. 07641

Division of Ser. No. 439,628, Feb. 4, 1975, Pat. No. 4,038,373, which is a continuation-in-part of Ser. No. 45,527, June 11, 1970, abandoned, and Ser. No. 127,351, March 23, 1971, abandoned, said Ser. No. 45,527, is a continuation-in-part of Ser. No. 859,703, Sept. 22, 1969, said Ser. No. 127,351, is a continuation-in-part of Ser. No. 859,703, , and Ser. No. 45,527,. This application Jan. 10, 1977, Ser. No. 758,344

Int. Cl.[2] C01F *7/00, 7/48*

U.S. Cl. 423—462 5 Claims

1. A method of preparing a polymeric aluminum halohydrate having a ratio of aluminum to halogen of from 2:1 to 2.7:1 and a stable pH of from about 4.2 to about 4.3 which comprises:

reacting, in an aqueous medium, a gaseous halogen selected from chlorine, bromine and iodine with mercury permeated aluminum of a purity of at least 99.98% by weight, the mercury content of said mercury permeated aluminum ranging from about 0.1 percent to about 5 percent by weight;

and collecting the formed aluminum halohydrate.

4,053,571

PROCESS FOR PURIFYING LITHIUM HEXAFLUOROARSENATE

Walter B. Ebner, Hartsville, and Charles Richard Walk, Collegeville, both of Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 31, 1977, Ser. No. 764,488

Int. Cl.[2] C01B *27/02;* C01D *15/00*

U.S. Cl. 423—464 5 Claims

1. A process for purifying lithium hexafluoroarsenate containing inorganic acidic impurities including $LiAsF_5OH$ and HF, which comprises contacting a solution of the impure lithium hexafluoroarsenate in an inert organic solvent with activated alumina to effect removal of said inorganic acidic impurities including $LiAsF_5OH$ and HF, and recovering the solution of purified lithium hexafluoroarsenate.

4,053,572

PROCESS FOR PREPARING ESSENTIALLY PURE BARIUM FLUORIDE CRYSTALS

Robert H. Moss, Cleveland Heights, and William F. Spicuzza, Eastlake, both of Ohio, assignors to The Harshaw Chemical Company, Cleveland, Ohio

Filed May 17, 1976, Ser. No. 687,049

Int. Cl.[2] C01F *11/22, 11/36, 11/18, 11/38*

U.S. Cl. 423—490 1 Claim

1. A wet process for preparing essentially pure barium fluoride crystals comprising:

a. dissolving barium nitrate in water to form an aqueous solution;

b. adding nitric acid to said aqueous solution to form an acidic solution, the concentration of said acidic solution being in the range from about 1 percent to about 15 percent HNO_3;

c. crystallizing barium nitrate crystals from said acidic solution, in which crystals either calcium or strontium element is coprecipitated as a salt in an amount less than 10 parts each per million parts by weight of said barium nitrate crystals;

d. converting said barium nitrate crystals to barium carbonate;

e. cleansing said barium carbonate by washing with water until the wash water gives no indication of nitrate or nitrite ions, and;

f. converting said barium carbonate to said barium fluoride crystals having less than 10 parts each of calcium or strontium present as a fluoride per million parts by weight of barium fluoride.

4,053,573

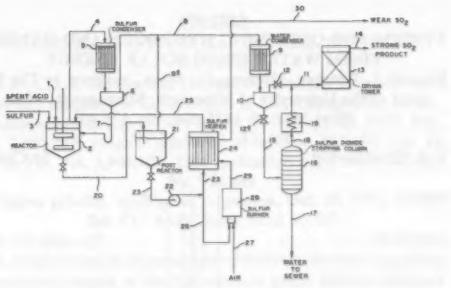
RECOVERY OF SULFUR VALUES FROM SPENT SULFURIC ACID

T. S. Harrer, deceased, late of Stratford, N.J. (by Eunice Harrer, executrix); Bela I. Karsay, DeWitt, and Robert L. Sturtevant, Baldwinsville, both of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 20, 1975, Ser. No. 633,765

Int. Cl.[2] C01B *17/50, 17/72, 17/90*

U.S. Cl. 423—540 19 Claims



1. In the method for recovering sulfur values from spent sulfuric acid by decomposing it at elevated temperature in the presence of elemental sulfur to generate a sulfur dioxide-containing gas stream, the improvement which comprises:

a. introducing spent sulfuric acid into a pool of molten sulfur maintained at temperature of at least about 250° C, wherein said pool of molten sulfur furnishes both the reaction medium as well as the reductant for said sulfuric acid, to thereby generate a gaseous stream comprising sulfur dioxide, vaporous elemental sulfur, and water;

b. cooling said gaseous stream comprising sulfur dioxide, vaporous elemental sulfur, and water to temperature above the melting point of the sulfur but below about 160° C. to condense elemental sulfur therefrom, separating said condensed elemental sulfur and returning it to said pool of molten sulfur; followed by

c. further cooling the gaseous stream from which elemental sulfur has been condensed to condense water therefrom, and separating the condensed water from the gaseous stream.

4,053,574

GAS DESULFURIZATION PROCESS

Neville L. Cull, Baker, and Paul E. Eberly, Jr., Baton Rouge, both of La., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed July 6, 1976, Ser. No. 703,056
Int. Cl.[2] C01B *17/04*
U.S. Cl. 423—573 G 13 Claims

1. A process for removing at least a portion of hydrogen sulfide from a gaseous mixture containing the same, which comprises contacting said gaseous mixture with a particulate tellurium dioxide reactant at reaction conditions and recovering a gaseous mixture having a reduced content of hydrogen sulfide.

4,053,575

SULFUR RECOVERY FROM H_2S AND SO_2-CONTAINING GASES

Larry A. Haas, Burnsville, and Sanaa E. Khalafalla, Minneapolis, both of Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Continuation-in-part of Ser. No. 498,790, Aug. 19, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 667,060
Int. Cl.[2] C01B *17/04*
U.S. Cl. 423—575 1 Claim

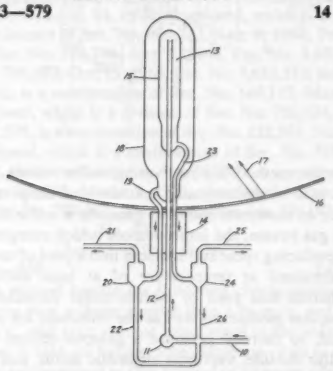
1. A process for recovery of sulfur comprising the steps of (1) loading of an absorbent selected from the group consisting of ethylene glycol, diethylene glycol, triethylene glycol, and propylene glycol with a mixture of hydrogen sulfide and sulfur dioxide by absorbing hydrogen sulfide, sulfur dioxide, or mixtures thereof from waste gases that additionally contain carbon dioxide, oxygen or nitrogen and (2) reacting the hydrogen sulfide and sulfur dioxide, in solution in the absorbent, in contact with a solid catalyst, the active ingredient of which is alumina.

4,053,576

SYSTEM FOR OBTAINING HYDROGEN AND OXYGEN FROM WATER USING SOLAR ENERGY

Edward A. Fletcher, Minneapolis, Minn., assignor to The Regents of the University of Minnesota, Minneapolis, Minn.

Filed May 19, 1975, Ser. No. 578,404
Int. Cl.[2] C01B *13/00*
U.S. Cl. 423—579 14 Claims



1. Apparatus for obtaining hydrogen and oxygen from water utilizing solar energy, said apparatus comprising:

A. a water-dissociation chamber having a wall preferentially permeable to the passage of lower molecular weight dissociation components including hydrogen,

B. means connected to the dissociation chamber for supplying water to said chamber,

C. solar energy concentrating means focused on said dissociation chamber for heating said chamber to a temperature at which water is dissociated into steam, molecular hydrogen, molecular oxygen, atomic hydrogen, atomic oxygen and hydroxyl,

D. means connected to the dissociation chamber for withdrawing oxygen enriched dissociation products from said chamber,

E. a non-permeable casing saced from and enclosing said dissociation chamber wall and forming a hydrogen enriched dissociation product collection chamber,

F. means connected to said collection chamber for withdrawing hydrogen enriched dissociation product from said chamber,

G. cooling means for cooling said oxygen enriched dissociation products and partially liquefying the same, and

H. gas-liquid separation means for separating gaseous oxygen from the cooled oxygen enriched dissociation products.

9. A method for obtaining hydrogen and oxygen from water utilizing solar energy, said method comprising:

A. supplying water to a dissociation zone, having a wall preferentially permeable to the passage of lower molecular weight dissociation components, including hydrogen

B. causing said water within said zone to dissociate into steam, molecular hydrogen, molecular oxygen, atomic hydrogen, atomic oxygen and hydroxyl by heating by means of concentrated solar energy to a temperature at which water is dissociated,

C. separating hydrogen enriched dissociation product from said dissociation zone by preferential diffusion through said wall, and collecting said hydrogen enriched product,

D. withdrawing said hydrogen enriched dissociation product,

E. withdrawing oxygen enriched dissociation products remaining in said dissociation zone and cooling to liquefy a portion of the same, and

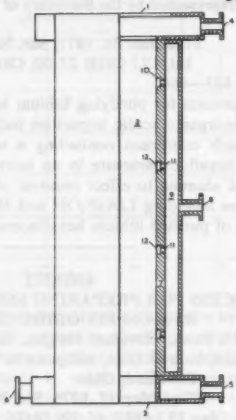
F. separating gaseous oxygen from the resulting mixture.

4,053,577

PROCESS FOR THE GASEOUS PHASE PRODUCTION OF METAL OXIDE PARTICLES

Kenneth Arkless, Stockton-on-Tees, England, assignor to Tioxide Group Limited, Billingham, England

Continuation of Ser. No. 308,497, Nov. 21, 1972, abandoned. This application Aug. 11, 1975, Ser. No. 603,785
Claims priority, application United Kingdom, Feb. 18, 1972, 7570/72
Int. Cl.[2] C01G *1/03, 23/04*
U.S. Cl. 423—592 17 Claims



1. In a process for the production of finely-divided metal

oxides which comprises oxidizing the corresponding metal halide with an oxidizing gas by introducing into one end of a reaction zone a hot stream of primary gas selected from an inert gas, the oxidizing gas or the metal halide, introducing a secondary gas selected from the oxidizing gas, the metal halide or mixtures thereof into the primary gas stream through an injection device surrounding at least part of the reaction zone, said injection device comprising a wall having a plurality of separate apertures therethrough, each aperture having an inlet end and an outlet end and each aperture connecting the reaction zone to a secondary gas jacket, said wall dividing said reaction zone from said jacket, the inlet end of said aperture being at the interface of said wall and said reaction zone, the secondary gas being supplied to the reaction zone through said jacket in such a manner that it cools the wall of the injection device and is thereby preheated before it passes through the apertures into the primary gas stream, the inprovement comprising forming said apertures with at least two segments of different cross-sectional areas along their length, the segment of smaller cross-sectional area being at the inlet end of the apertures for the secondary gas, and the segment of larger cross-sectional area being at the outlet end of said apertures, said segment of larger cross-sectional area being of sufficient cross-section and extending for a sufficient length of said apertures to preclude substantial accretion of metal oxide around the edge of the aperture.

4,053,578
PROCESS FOR OXIDIZING PRIMARILY NICKEL POWDERS

Brian Hill, Ramsey, N.J., and William Herbert Elwood, Jr., Warwick, N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 425,202, Dec. 17, 1973, abandoned. This application Dec. 10, 1975, Ser. No. 639,486

Int. Cl.[2] C01G *53/04*

U.S. Cl. 423—592 **10 Claims**

1. A process for producing nickel oxide (NiO) which is both readily friable and of high purity which comprises forming a blend of nickel powder and water, the water content being present in an amount of about 2% and sufficient to prevent the occurrence of deleterious sintering during subsequent heat treatment with the upper level being about 20%, subjecting the blend to a preheat treatment in which the blend is exposed to air and a temperature within the range of about 700° F. to about 1350° F. such as to form an outer oxide shell substantially about the powder particle surfaces, whereby undesirable sintering during firing is greatly inhibited, the preheating temperature not exceeding that at which excessive exothermic reaction occurs, and thereafter firing the preheat treated product at a temperature of about 1500° F. to about 1850° F. to complete the oxidation process.

4,053,579
METHOD FOR MANUFACTURE OF SINTERED ALUMINA FROM AMMONIUM ALUMINUM CARBONATE HYDROXIDE

Shuzo Kato; Takeo Iga, both of Nagoya; Shogo Hatano, Minami-Minowa, and Yuichi Isawa, Takato, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,489

Claims priority, application Japan, May 29, 1975, 50-65076

Int. Cl.[2] C01F *7/02;* **C01C** *1/26;* **A61K** *33/10*

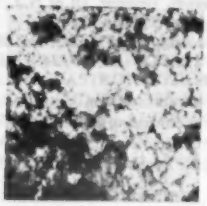
U.S. Cl. 423—630 **2 Claims**

1. A method for the manufacture at low temperatures, of a compactly sintered high-purity alumina having a bulk density greater than 3.8 g/cc, which comprises:

adding to a solution of ammonium hydrogen carbonate having a concentration of from 40 g/1. to 270 g/1. a solution of at least one aluminum salt selected from the group consisting of aluminum chloride, aluminum nitrate, aluminum sulfate, ammonium aluminum sulfate and basic salts thereof having a concentration of from 5 g/1. to 150g/1. computed as aluminum oxide, the amount added being not less than 0.07 and not more than 0.75 of the equivalent weight computed as $A1/NH_4$, the rate of addition of said solution being from 0.03 1./hr. to 1.8 1/hr. per 1000 cc of said solution of ammonium hydrogen carbonate and the resulting addition reaction being conducted at a temperature of from 30° to 35° C and a pH of from 7.5 to 9.0,

allowing the resultant solution to stand to permit growth of crystals of ammonium aluminum carbonate hydroxide,

filtering said solution containing grown crystals of ammonium aluminum carbonate hydroxide to obtain crystals of ammonium aluminum carbonate hydroxide,



drying the crystals,

subjecting the dried crystals of ammonium aluminum carbonate hydroxide to thermal decomposition at temperatures in the range of from 1,250° to 1,300° C to afford α-alumina capable of being readily sintered,

adding to said α-alumina an organic binder,

molding the resultant mixture under pressure and

sintering the molded mixture at temperatures in the range of from 1600° to 1700° C to obtain a compactly sintered high-purity alumina having a bulk density greater than 3.8 g/cc.

4,053,580
MICROSEALED PHARMACEUTICAL DELIVERY DEVICE

Yie W. Chien, Skokie, and Howard J. Lambert, Deerfield, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

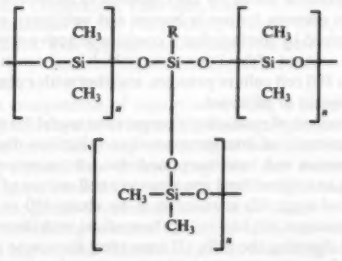
Continuation-in-part of Ser. No. 617,542, Sept. 29, 1975, Pat. No. 3,992,518, which is a division of Ser. No. 517,454, Oct. 24, 1974, Pat. No. 3,946,106. This application Sept. 20, 1976, Ser. No. 724,688

Claims priority, application Argentina, Oct. 23, 1975, 260899

Int. Cl.[2] A61K *9/00, 9/52, 47/00*

U.S. Cl. 424—15 **26 Claims**

1. A microsealed pharmaceutical delivery device comprising a sectioned length of flexible medical grade silicone polymer hollow tubing as a biologically acceptable polymer container with as many perforations in the wall of the tubing when unsealed at each end as to expose up to 40% of an inner biologically acceptable silicone polymer matrix contained with the biologically acceptable polymer container, said biologically acceptable silicone polymer matrix having the formula



wherein R is alkoxy having 1-7 carbon atoms, alkyl having 1-10 carbon atoms, phenyl, vinyl, or allyl, wherein *n* is about 100-5000 and having 10-200 micron microsealed compartments throughout, said microsealed compartments containing pharmaceutical saturated 20-70 w/v% polyethylene glycol molecular weight 450-6000, 20-70 v/v% propylene glycol, or 20-70% 1-3-butanediol in water as hydrophilic solvent system.

4,053,581

ANTIPERSPIRANT SOLUTION CONTAINING A MIXTURE OF SUBSTANTIALLY VOLATILE AND SUBSTANTIALLY NON-VOLATILE SILOXANE LIQUIDS

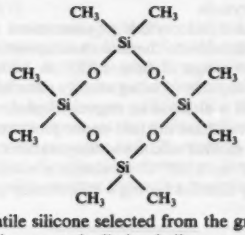
Morton Pader, Teaneck; John J. Miles, Jr., Lake Intervale, and William Netzbandt, Dumont, all of N.J., assignors to Lever Brothers Company, New York, N.Y.

Filed Aug. 15, 1975, Ser. No. 605,377

Int. Cl.[2] A61K *7/34, 7/38*

U.S. Cl. 424—68 **15 Claims**

1. An antiperspirant solution suitable for pump spray or roll-on application consisting essentially of an alcohol soluble aluminum chlorhydroxide complex; a sufficient amount of a mixture of a volatile cyclic polydimethyl siloxane of the structural formula



and a non-volatile silicone selected from the group consisting of polyalkyl siloxane, polyalkylaryl siloxane, polyether siloxane copolymer and mixtures thereof, to substantially reduce the tackiness of said complex during drying; and a sufficent amount of alcohol to result in said solution; said composition being characterized by having substantially reduced tackiness and giving a perception of quick drying when applied from a pump spray or a roll-on applicator and a substantially reduced tendency to malfunction when applied from said pump spray or roll-on applicator.

4,053,582

ATTENUATED FOWL POX VIRUS PREPARATION FOR THE TREATMENT OF INFECTIOUS DISEASES, METHOD FOR THE MANUFACTURE THEREOF, AND ITS USE

Helmut Anton Stickl, Starenweg 6,, 8033 Krailling B. Munich, Germany

Filed July 28, 1975, Ser. No. 599,533

Claims priority, application Germany, Aug. 1, 1974, 2437166

Int. Cl.[2] A61K *39/12;* **C12K** *7/00*

U.S. Cl. 424—89 **14 Claims**

1. Preparation useful for the treatment of interferonsensitive infectious diseases for use in human and veterinary medicine, characterized by the fact that it contains as active principle an effective amount of fowl pox virus, which has been attenuated by 420 to 800 cell culture passages, together with a pharmaceutical excipient or adjuvant.

8. A method of producing a preparation useful for the endogenic treatment of interferon-sensitive infectious diseases for use in human and veterinary medicine, characterized by (1) applying an original fowl pox virus to a cell culture of embryonated fowl eggs, (2) attenuating it by about 420 to 800 cell culture passages, (3) harvesting the medium with the remaining cells, (4) digesting the cells, (5) separating the coarse cell components from the virus, and (6) recovering the virus from the virus-containing supernatant material by centrifuging, precipitation, or freezedrying.

4,053,583

LIVE NEWCASTLE DISEASE VIRUS VACCINES

Jacqueline Gits, La Hulpe, and Nathan Zygraich, Bruxelles, both of Belgium, assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Mar. 1, 1976, Ser. No. 662,770

Int. Cl.[2] A61K *39/32, 41/00*

U.S. Cl. 424—90 **5 Claims**

1. An improved vaccine against Newcastle disease comprising a pharmaceutical diluent for aerosol adminisitration and an effective dose of an attenuated cold and temperature-sensitive strain obtained from a Newcastle disease virus strain by ultraviolet mutagenesis thereof, said strain showing a significantly higher growth at 26° C than its parent strain and having a significantly inhibited growth at 41° C.

4,053,584

PRE-FARROWING PREGNANT SOW PIGLET COLIBACILLOSIS VACCINES AND PROCESS FOR THEIR ADMINISTRATION TO PREGNANT SOWS BEFORE FARROWING

Lucia Dobrescu, Brussels, and Constant Huygelen, Huldenberg, both of Belgium, assignors to Recherche et Industrie Therapeutiques, Belgium

Continuation of Ser. No. 549,237, Feb. 12, 1975, abandoned, which is a continuation-in-part of Ser. No. 311,998, Dec. 4, 1972, abandoned. This application Mar. 29, 1976, Ser. No. 671,463

Int. Cl.[2] A61K *39/02, 39/40*

U.S. Cl. 424—92 **8 Claims**

1. A pre-farrowing pregnant sow piglet colibacillosis vaccine for intramuscular or subcutaneous administration to pregnant sows 3 to 6 weeks before farrowing comprising a unit dosage or multidose integer of the dosage of an effective amount of at least 5 to 150 mg. lipopolysaccharide- and cell-free heat labile (LT) *E. coli* enterotoxin isolated from a culture of an *E. coli* serotypewhich is capable of causing piglet colibacillosis and protective against the actions of heat stable and heat labile enterotoxins produced by heterologous as well as homologous enteropathogenic *E. coli* serotypes, and an effective amount of an adjuvant selected from the group consisting of aluminium hydroxide, aluminium phosphate, peanut oil emulsified by the addition of monooleate and stabilized by the addition of aluminium monostearate or Freund's adjuvant.

4,053,585

IMMUNOLOGICAL PREPARATIONS

Anthony Clifford Allison, London, and Gregory Gregoriadis, Kenton, both of England, assignors to National Research Development Corporation, England

Filed June 25, 1975, Ser. No. 590,270

Claims priority, application United Kingdom, June 25, 1974, 28131/74

Int. Cl.[2] A61K *39/00, 39/02, 39/12, 39/18*

U.S. Cl. 424—92 **16 Claims**

1. A pharmaceutical preparation for administration in vivo to effect immunization comprising an immunologically effective agent selected from bacterial toxoids which agent is incorporated essentially entrapped liposomes, said liposomes having a negative charge.

4,053,586

PREPARATION FOR TREATING SQUAMOUS CELL CARCINOMA AND METHOD FOR MAKING SAME

George T. Manilla, Elko, Nev., assignor to Intermountain Laboratories, Inc., Salt Lake City, Utah

Continuation-in-part of Ser. No. 187,866, Oct. 8, 1971, abandoned. This application Nov. 1, 1976, Ser. No. 737,549

Int. Cl.[2] A61K *35/12, 35/44*

U.S. Cl. 424—95 11 Claims

1. A method for preparing a biological preparation for treatment of squamous cell carcinoma, comprising the steps of:

homogenizing squamous cell carcinoma cells in a one to five molar hypertonic metallic chloride salt solution containing an adsorbing agent and a suspending agent at a temperature below about 60° C.;

extracting the cells in the suspension for at least about 12 hours at a temperature of at least about 26° C.;

separating the liquid extract from the solid material to produce a liquid containing the cell extract;

contacting the liquid containing the cell extract with an aqueous metallic chloride salt solution and a low carbon chain alcohol for at least about 12 hours at a temperature of from about 4° C to about 25° C to strip the cell extract from the liquid and to form a precipitate containing the extract;

dissolving the precipitate in an organic extraction medium, and allowing the solution to stand for a sufficient amount of time to purify the extract; and

reducing the presence of the extracting medium to precipitate the purified cell extract.

4,053,587

METHOD OF TREATING VIRAL INFECTIONS

James P. Davidson, Lansing; Barnett Rosenberg, Holt, both of Mich., and Ronald W. Hinz, Avoca, Iowa, assignors to Research Corporation, New York, N.Y.

Continuation of Ser. No. 350,924, April 13, 1973, abandoned. This application Jan. 10, 1975, Ser. No. 540,109

Int. Cl.[2] A61K *33/24*

U.S. Cl. 424—131 5 Claims

1. A method for treating an animal afflicted with a viral infection comprising administering to said animal an effective anti-viral amount of a platinum coordination compound of the formula:

$[Pt(II)A_mB_{(4-m)}/2]$

or

cis or trans $[Pt(IV)A_nB_{(6-n)}/2]$

wherein:

A represents the monodenate ligands Cl, NH_3 or a mixture thereof;

B represents an aliphatic diamine ligand;

m is 0, 2 or 4, and

n is 0, 2, 4 or 6

4,053,588

PHARMACEUTICAL PREPARATIONS HAVING PSYCHOTROPIC ACTIVITY AND PROCESS FOR THEIR MANUFACTURE

Wolfgang Konig, Hofheim, Taunus; Rolf Geiger, Frankfurt am Main; Hans Wissmann, Bad Soden, Taunus; Hansjörg Kruse, Kelkheim, Taunus, all of Germany, and Michel Peterfalvi, Paris, France, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

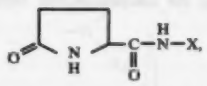
Filed May 12, 1975, Ser. No. 576,715

Claims priority, application Germany, May 14, 1974, 2423389

Int. Cl.[2] A61K *31/40, 37/00, 37/02*

U.S. Cl. 424—177 1 Claim

1. A method for treating depression is a patient suffering therefrom, which comprises administering to said patient an effective amount of a compound of the formula



wherein X is branched or unbranched alkyl having 2 to 6 carbon atoms, or branched or unbranched alkyl having 2 to 6 carbon atoms substituted by carboxy or carboxamido.

4,053,589

METHOD OF TREATING NUTRITIONAL DEFICIENCY DURING CARDIAC CACHEXIA, DIABETES, HYPOGLYCEMIA, GASTROENTEROLOGY, LIPID, CELL GLYCOGEN AND KERATIN-RELATED SKIN CONDITIONS AND ALCOHOLISM

Arnold M. Gans, Closter, N.J.; Alvin J. Goren, North Bergen, N.J., and Eli M. Gorenberg, Fair Lawn, N.J., assignors to Control Drug Inc., Port Redding, N.J.

Division of Ser. No. 634,857, Nov. 24, 1975. This application June 22, 1976, Ser. No. 698,353

Int. Cl.[2] A01N *9/20;* A61K *37/00*

U.S. Cl. 424—177 4 Claims

1. A method of treating nutritional deficiency during cardiac cachexia, diabetes, hypoglycemia, gastroenterology, skin conditions related to lipid, cell glycogen and keratin deficiencies, and alcoholism which comprises administering by ingestion to a patient having such a deficiency a nutritionally effective amount of a composition comprising about 5 to about 75 parts by weight of hydrolyzed gelatin, about 0.02 to about 0.75 parts by weight of tryptophane, about 0.1 to about 2 parts by weight of a sweetener, and about 5 to about 100 parts by weight of an ingestible carrier, said nutritional composition containing essentially the following amino acids in parts by weight: about 13 parts L-alanine, about 12 parts L-arginine, about 9 parts L-aspartic acid, about 0.1 parts L-cystine, about 15 parts L-glutamic acid, about 35 parts glycine, about 1.1 parts L-histidine, about 10 parts L-hydroxyproline, about 4.5 parts L-leucine, about 2 parts L-isoleucine, about 6.5 parts L-lysine, about 1.5 parts hydroxylysine, about 1.1 parts L-methionine, about 3.5 parts L-phenylalanine, about 23 parts L-proline, about 10 parts L-serine, about 3 parts L-threonine, about 0.65 parts L-tryptophane, about 1 part L-tyrosine, and about 3.5 parts L-valine.

4,053,590

COMPOSITIONS OF MATTER COMPRISING MACROMOLECULAR HEMOGLOBIN

Pieter Bonsen, Los Altos, Calif.; Myron B. Laver, Weston, Mass., and Kent C. Morris, Mountain View, Calif., assignors to Alza Corporation, Palo Atlo, Calif.

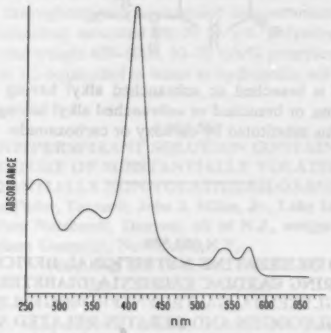
Continuation of Ser. No. 554,051, Feb. 27, 1975, Pat. No. 4,001,200. This application Oct. 12, 1976, Ser. No. 731,704

Int. Cl.[2] C07C *103/52;* A61K *37/00*

U.S. Cl. 424—177 8 Claims

1. A composition of matter comprising a macromolecular hemoglobin capable of reversibly binding a gaseous ligand and selected from the group consisting of intermolecularly cross-linked, stromal-free deoxyhemoglobin and intermolecularly cross-linked, stromal-free oxyhemoglobin which macromolecular hemoglobin is intermoleculary cross-linked with a covalent cross-linking member having at least two cross-linking groups and selected from the members consisting of heterocyclic triazines, bis(diazobenzidines), halogenated aromatics,

cycloalkanes, dialdehydes, sulfones, diisocyanates and diepoxides, and wherein the macromolecular hemoglobin is mixed



with an acceptable carrier to form the composition useful as a blood substitute and as a plasma expander.

4,053,591

5-DEOXY-4,6-DI-O-(AMINOGLYCOSYL)-1,3-DIAMINOCYCLITOLS, METHODS FOR THEIR MANUFACTURE, METHOD FOR THEIR USE AS ANTIBACTERIAL AGENTS AND COMPOSITIONS USEFUL THEREFOR

Peter J. L. Daniels, Cedar Grove, and Stuart W. McCombie, East Orange, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed June 30, 1976, Ser. No. 701,387
Int. Cl.[2] A61K *31/71;* **C07H** *15/22*
U.S. Cl. 424—180 **15 Claims**

14. The method of eliciting an antibacterial response in a warm-blooded animal having a susceptible bacterial infection which comprises administering to said animal a non-toxic, antibacterially effective amount of a member selected from the group consisting of a 5-deoxy-4,6-di-O-(aminoglycosyl)-1,3-diaminocyclitol selected from the group consisting of

5-deoxygentamicin B,
5-deoxygentamicin B_1,
5-deoxygentamicin C_{1a},
5-deoxygentamicin C_2,
5-deoxygentamicin C_{2a},
5-deoxygentamicin X_1,
5-deoxygentamicin X_2,
5-deoxy-Antibiotic 66-40B,
5-deoxy-Antibiotic 66-40D,
5-deoxy-Antibiotic G-418,
5-deoxy-Antibiotic JI-20A,
5-deoxy-Antibiotic JI-20B,
5-deoxyverdamicin,
5-deoxykanamycin B,
5-deoxykanamycin C,
5,3',4'-trideoxykanamycin B,
5-deoxy-Aminoglycoside XK-88-5,
5-deoxytobramycin;

the 1-N-X derivatives thereof wherein X is a substituent selected from the group consisting of $—CH_2Z$ and

wherein Z is a member selected from the group consisting of hydrogen, alkyl, alkenyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl, aminoalkyl, alkylaminoalkyl, aminohydroxyalkyl, alkylaminohydroxyalkyl, phenyl, benzyl, and tolyl, said substituent Z having up to 7 carbon atoms and, when substituted by amino and hydroxy, bearing the substituents on different carbon atoms;

the 2'-N-CH_2Z, 6'-N-CH_2Z, 1,2'-di-N-CH_2Z and the 1,6'-di-N-CH_2Z derivatives thereof wherein Z is as hereinabove defined;

5-deoxy-Antibiotic G-52 and the 1-N-X derivatives thereof wherein X is as hereinabove defined;

and the pharmaceutically acceptable acid addition salts thereof.

4,053,592

ANIMAL GROWTH PROMOTANT

Irvin Darrow Smith, Waukegan, and Eugene Wesley Seymour, Libertyville, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Mar. 16, 1973, Ser. No. 341,819
Int. Cl.[2] A61K *31/71*
U.S. Cl. 424—181 **6 Claims**

1. A method of increasing the rate of growth of warm-blooded vertebrate animals including pigs, comprising orally administering to said warm-blooded vertebrate animals a feed composition containing an amount of 2–100 grams of anhydroerythromycin per ton of said feed composition, whereby growth of said animals is accelerated.

4,053,593

MEDICAL PRODUCT COMBINING ANTIMICROBIAL, ANTIPORASITIC AND VITAMIN COMPLEX

Lew Frumoff, D-145 Monaco Way, Delray Beach, Fla. 33446

Filed Nov. 26, 1975, Ser. No. 635,610
Int. Cl.[2] A61K *31/71, 31/68, 31/345*
U.S. Cl. 424—181 **12 Claims**

1. A medical product for use in preventing and curing diseases in fish, comprising effective amounts an antimicrobial agent, a chemically compatible antiparasitic agent and a chemically compatible vitamin complex.

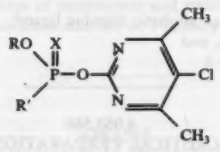
4,053,594

O-ALKYL-O-[4,6-DIMETHYL-5-CHLOROPYRIMIDIN-(2)-YL]-(THIONO) (THIOL) PHOSPHORIC ACID ESTERS

Hans-Jochem Riebel, Wuppertal; Bernhard Homeyer, Leverkusen, and Ingeborg Hammann, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 20, 1975, Ser. No. 624,219
Claims priority, application Germany, Oct. 26, 1974, 2450951
Int. Cl.[2] A01N *9/36;* **C07D** *239/34*
U.S. Cl. 424—200 **10 Claims**

1. An O-alkyl-O-[4,6-dimethyl-5-chloropyrimidin(2)yl]-(thiono) (thiol)phosphoric acid ester of the formula



in which

R is alkyl with 1 to 6 carbon atoms,

R' is alkoxy or alkylthio with 1 to 6 carbon atoms in each alkyl chain, and

X is oxygen or sulfur.

8. An insecticidal, acaricidal or nematicidal composition containing as active ingredient an insecticidally, acaricidally or nematicidally effective amount of a compound according to claim **1** in admixture with a diluent.

9. A method of combating insects, acarids or nematodes which comprises applying to the insects, acarids or nematodes or to a habitat thereof an insecticidally, acaricidally or nematicidally effective amount of a compound according to claim **1.**

4,053,595

SYNERGISTIC COMPOSITION FOR THE CONTROL OF INSECTS

Walter Maria Zeck; August Cesar deMarshall, and André Prosper Wybou, all of Vero Beach, Fla., assignors to Mobay Chemical Corporation, Pittsburgh, Pa. and Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 11, 1975, Ser. No. 639,957
Int. Cl.[2] A01N *9/02, 9/20, 9/36*
U.S. Cl. 424—216 9 Claims

3. A method for combating insects which comprises applying to such insects or an insect habitat an insecticidally effective amount of a composition comprising O-ethyl-O-[4-(methylthio)-phenyl]-S-propyl phosphorodithioate and N'-(4-chloro-o-tolyl)-N,N-dimethylformamidine in a weight ratio of about 1 : 0.125 – 0.5.

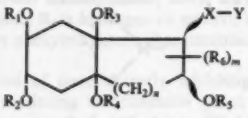
4,053,596

INDANPENTOL DERIVATIVES

Frederic Peter Hauck, Somerville; Joyce Reid, Highland Park; Venkatachala L. Narayanan, Hightstown; Christopher M. Cimarusti, Hamilton; Rudiger D. Haugwitz, Titusville, all of N.J., and Joseph E. Sundeen, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jan. 14, 1976, Ser. No. 649,116
Int. Cl.[2] C07D *211/14;* A61K *31/445*
U.S. Cl. 424—244 18 Claims

1. A compound of the structure



wherein R_1, R_2, R_3, R_4 and R_5 are the same or different and are selected from the group consisting of hydrogen, lower alkyl, trifluoromethyl, mono-halo-lower alkyl wherein the halogen is F, Cl, Br or I, acyl radical of a hydrocarbon carboxylic acid of less than 12 carbon atoms, amido, lower alkoxyalkylene and lower alkoxy carbonyl, X is a single bond or a straight or branched chain alkylene group of the structure $(CH_2)_{n'}$ wherein *n' is* 0 to 10, Y is

wherein R_7 and R_8 are the same or different and are selected from the group consisting of hydrogen, lower alkyl, trifluoromethyl, monocyclic cycloalkyl having 3 to 6 ring members, monocyclic cycloalkyl lower alkyl, wherein the cycloalkyl has 3 to 6 ring members, hydroxy-lower alkyl, phenyl, lower alkylphenyl, acyl radical of a hydrocarbon carboxylic acid of less than 12 carbon atoms, di(lower alkyl)phenyl, halophenyl, mono-, di- or tri-nitrophenyl, phenyl lower alkyl, monocyclic heterocyclic, wherein lower alkyl contains 1 to 8 carbons, R_6 is lower alkyl or cycloalkyl having 3 to 6 ring members, and

can be taken together to form a heterocyclic radical; wherein the heterocyclic radicals represented by R_7, R_8 or

taken together contain 5-, 6- or 7-members in the heterocyclic ring, the ring being pyrrolidine, piperidine, morpholine, thiamorpholine, piperazine or homopiperazine provided that one of said rings is always present, and *n* is 1 to 3; *m* is 0, 1 or 2; stereoisomers thereof, physiologically acceptable acid salts thereof, physiologically acceptable quaternary salts thereof and N-oxides thereof.

17. A hypertensive composition comprising an effective amount of compound as defined in claim 1 and a pharmaceutically acceptable carrier thereof.

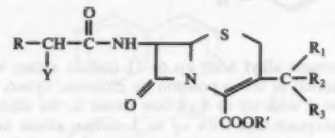
4,053,597

HYDROXY-PHENYLACETAMIDO CEPHALOSPORIN COMPOSITIONS AND METHOD OF USE

Jacques Martel, Bondy; Rene Heymes, Romainville, and Andre Lutz, Strasbourg, all of France, assignors to Roussel-UCLAF, Paris, France

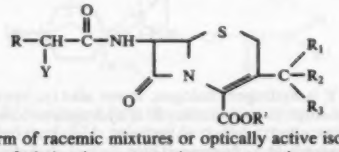
Division of Ser. No. 436,502, Jan. 25, 1974, Pat. No. 3,940,354. This application Nov. 25, 1975, Ser. No. 635,383
Claims priority, application France, Jan. 31, 1973, 73.03315
Int. Cl.[2] A61K *31/545;* C07D *5.1/22*
U.S. Cl. 424—246 6 Claims

1. an antibiotic composition comprising an effective amount of a compound of the formula



in the form of racemic mixtures or optically active isomers or in form of their cis or trans isomers or mixtures thereof wherein R is phenyl substituted with one hydroxyl, R' is selected from the group consisting of hydrogen and R'', R'' is selected from the group consisting of alkyl of 1 to 6 carbon atoms optionally substituted with one to three chlorine and aralkyl of 7 to 15 carbon atoms, R_1 and R_2 are alkyl of 1 to 3 carbon atoms, R_3 is selected from the group consisting of hydrogen and alkyl of 1 to 3 carbon atoms, Y is selected from the group consisting of amino and Y', Y' is hydrogen and NHCOOZ, Z is straight or branched alkyl of 1 to 5 carbon atoms and their non-toxic pharmaceutically acceptable addition salts with organic and inorganic acids and bases where appropriate with the proviso that when Y is amino, R' is hydrogen and when Y is amino or NHCOOZ, R is phenyl, and a pharmaceutical carrier.

4. A method of combatting bacterial infections in warm-blooded animals comprising administering to warm-blooded animals a bactericidally effective amount of (at least one) a compound of formula



in the form of racemic mixtures or optically active isomers or in form of their cis or trans isomers or mixtures thereof wherein R is phenyl substituted with one hydroxyl, R' is selected from the group consisting of hydrogen and R'', R'' is selected from the group consisting of alkyl of 1 to 6 carbon

atoms optionally substituted with one to three chlorine and aralkyl of 7 to 15 carbon atoms, R_1 and R_2 are alkyl of 1 to 3 carbon atoms, R_3 is selected from the group consisting of hydrogen and alkyl of 1 to 3 carbon atoms, Y is selected from the group consisting of amino and Y', Y' is hydrogen and NHCOOZ, Z is straight or branched alkyl or 1 to 5 carbon atoms and their non-toxic, pharmaceutically acceptable addition salts with organic and inorganic acids and bases where appropriate with the proviso that when Y is amino, R' is hydrogen and when Y is amino or NHCOOZ, R is phenyl.

4,053,598

PREPARATION OF 2,4-DIOXO-1,2,3,4-TETRAHYDRO-s-TRIAZINO-[1,2-a]-BENZIMIDAZOLES

Werner Daum, Krefeld, and Paul-Ernst Frohberger, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

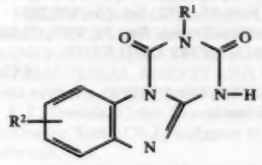
Filed June 9, 1976, Ser. No. 694,418

Claims priority, application Germany, June 21, 1975, 2527677

Int. Cl.[2] C07D *413/14;* A61K *31/53;* C07D *487/04;* A61K *31/535*

U.S. Cl. 424—248.56 **23 Claims**

16. A 2,4-dioxo-1,2,3,4-tetrahydro-s-triazino-[1,2-a]-benzimidazole of the formula



in which

R^1 represents alkyl with up to 11 carbon atoms which is substituted in the ω-position by chlorine, cyano, alkoxycarbonyl with up to 4 carbon atoms in the alkoxy part, alkenoxycarbonyl with up to 3 carbon atoms in the alkenoxy part or N-morpholino, or represents dialkylamino, with up to 4 carbon atoms in each alkyl group and

R^2 represents hydrogen or methyl.

22. A fungicidal composition containing as active ingredient a fungicidally effective amount of a compound according to claim **16** in admixture with a diluent.

4,053,599

PIPERAZIONALKYLPYRROLOBENZOXAZALKANES

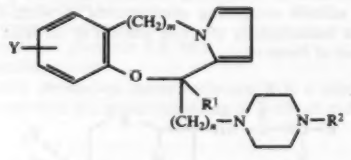
Richard C. Effland, Bridgewater; Larry Davis, Flemington, both of N.J., and Wolfgang Schaub, Kelkheim, Germany, assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed Feb. 26, 1976, Ser. No. 661,534

Int. Cl.[2] A61K *31/495;* C07D *295/10*

U.S. Cl. 424—250 **17 Claims**

1. A compound of the formula



wherein Y is hydrogen, halogen, lower alkoxy, lower alkyl, trifluoromethyl, nitro or amino; R^1 is hydrogen or lower alkyl; R^2 is lower alkyl, phenyl, halophenyl, lower alkoxyphenyl, lower alkylphenyl, trifluoromethylphenyl or nitrophenyl; m is the integer 1 or 2 and n is the integer 1, 2 or 3; and the physiologically tolerable acid addition salts thereof.

10. A method of treating hypertension which comprises administering to a patient a pharmaceutically effective amount of a compound defined in claim **1.**

4,053,600

TRICYCLIC 1,2,4-TRIAZOLO-QUINAZOLINES

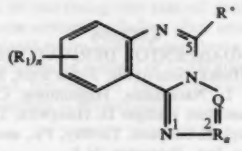
Goetz E. Hardtmann, Morristown, and Faizulla G. Kathawala, West Orange, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 339,177, March 8, 1973, abandoned, which is a continuation-in-part of Ser. No. 209,425, Dec. 17, 1971, abandoned, which is a continuation-in-part of Ser. No. 72,799, Sept. 16, 1970, abandoned. This application June 25, 1975, Ser. No. 590,041

Int. Cl.[2] C07D *487/04;* A61K *31/505*

U.S. Cl. 424—250 **28 Claims**

1. A compound of the formula



wherein

Q and R_a are different and either a nitrogen atom or a $=CR'''$-function,

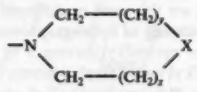
R° represents

R' represents hydrogen, and

R'' represents hydrogen; lower alkyl of 1 to 5 carbon atoms; allyl; methylally; propargyl; cycloalkyl of 3 to 6 carbon atoms; or di(lower of 1 to 3 carbon atoms)alkylamino-(lower of 1 to 4 carbon atoms)alkyl; or lower alkoxy of 1 to 4 carbon atoms (lower of 1 to 4 carbon atoms)alkyl; or

R' and R'' together with the nitrogen attached to the ring represent di(lower of 1 to 3 carbon atoms) alkylamino; diallylamino; di(methylallyl)amino; or dipropargylamino; or

R' and R'' together with the nitrogen attached to the tricyclic ring system form a 3 to 6 membered saturated heterocyclic group represented by:



wherein X is (a) a direct bond or (b) methylene, and *y* and *z* are 0 or 1, provided that X is a direct bond when either *y* or *z* is 0;

R''' represents hydrogen or lower alkyl of 1 to 4 carbon atoms;

R_1 represents fluoro, chloro, bromo, lower alkyl of 1 to 3 carbon atoms, lower alkoxy of 1 to 3 carbon atoms, nitro, trifluoromethyl or, when *n* is 2, the two R_1's together form methylenedioxy, and

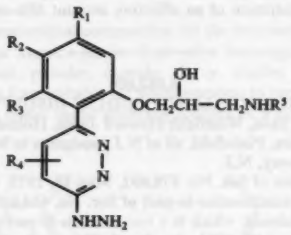
n is 0, 1, 2 and 3, and when 2, then R_1 may be the same or different, and when 3, then all R_1's are alkoxy; provided that *n* is 1 when R_1 is nitro or trifluoromethyl.

4,053,601
3-SUBSTITUTED-PHENYL-6-HYDRAZINE PYRIDAZINES

William John Coates, Welwyn Garden City; Anthony Maitland Roe, Hatfield; Robert Antony Slater, Letchworth, and Edwin Michael Taylor, Welwyn, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Filed June 3, 1975, Ser. No. 583,379
Claims priority, application United Kingdom, June 18, 1974, 26864/74
Int. Cl.[2] A61K *31/50*; C07D *237/20*
U.S. Cl. 424—250 25 Claims

1. A compound of the Formula:



wherein two of the groups R_1, R_2 and R_3 are hydrogen and the third group is hydrogen, lower akyl, fluoro, chloro, bromo, trifluoromethyl, hydroxy, lower alkoxy, lower alkenyloxy, lower alkoxycarbonyl, cyano, $—CONH_2$, $—CH_2CONH_2$, nitro, amino, lower alkanoylamino, lower alkylamino or di(-lower alkyl)amino; R_4 is hydrogen or methyl; R^5 is isopropyl, tertiary butyl or phenylethyl; or a pharmaceutically acceptable salt thereof.

17. A method of concomitantly inhibiting β-adrenergic receptors and producing vasodilatation which comprises administering a compound of claim 1 internally to an animal in need thereof in an amount sufficient to block said receptors and produce vasodilatation.

18. A method of treating hypertension which comprises administering a compound of claim 1 internally to an animal in need therof in an amount sufficient to alleviate said condition.

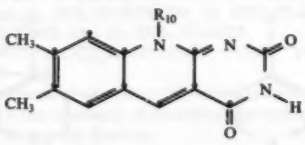
19. A method of treating angina pectoris which comprises administering a compound of claim 1 internally to an animal in need thereof in an amount sufficient to alleviate said condition.

4,053,602
COMPOSITIONS FOR TREATING COCCIDIOSIS CONTAINING 5-DEAZARIBOFLAVIN AND ITS DERIVATIVES

Donald W. Graham, Mountainside; Edward F. Rogers, Middletown, and Wallace T. Ashton, Clark, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 2, 1976, Ser. No. 737,890
Int. Cl.[2] A61K *31/505*, *31/675*
U.S. Cl. 424—251 11 Claims

1. A composition useful against coccidiosis that comprises a solid nutritive poultry feed having intimately dispersed therein an effective amount of 5-deazariboflavin or a derivative thereof having the structure:

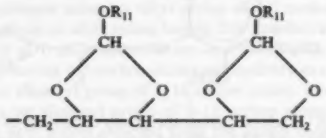


wherein R_{10} is:

$$—CH_2—(CHOH)_3—CH_2OR_5$$

wherein R_5 is H or

and non-toxic salts thereof; or R_{10} is:



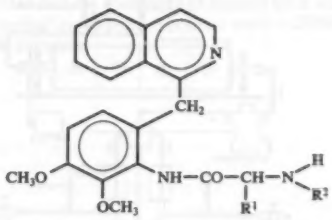
wherein R_{11} is an alkyl group containing 1 to 5 carbon atoms.

4,053,603
BENZYLISOQUINOLINE DERIVATIVES, AND USE AS ANTI-ARRHYTHMIC DRUGS

John Leopold Neumeyer, Wayland, and Paul Andre Tenthorey, Holden, both of Mass., assignors to Astra Pharmaceutical Products, Inc., Worcester, Mass.

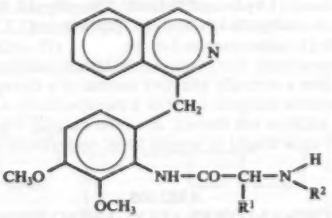
Filed July 9, 1976, Ser. No. 704,096
Int. Cl.[2] A61K *31/485*; C07D *217/20*
U.S. Cl. 424—258 27 Claims

1. A compound having the formula



wherein R^1 is selected from the group consisting of hydrogen and methyl, and R^2 is selected from the group consisting of methyl, ethyl, n-propyl, and isopropyl, and therapeutically acceptable acid addition salts thereof.

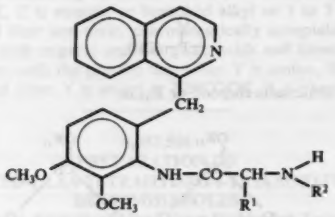
10. A pharmaceutical preparation for the suppression of cardiac arrhythmias comprising as an active ingredient an amount effective for the suppression of cardiac arrhythmias of a compound having the formula



wherein R^1 is selected from the group consisting of hydrogen and methyl, and R^2 is selected from the group consisting of methyl, ethyl, n-propyl, and isopropyl, and therapeutically acceptable acid addition salts thereof, in association with a pharmaceutically and therapeutically acceptable carrier.

19. A process for the suppression of cardiac arrhythmias in

mammals comprising administering to the mammal an amount effective for the suppression of cardiac arrhythmias of a compound having the formula



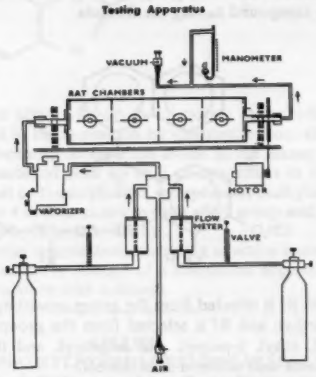
wherein R^1 is selected from the group consisting of hydrogen and methyl, and R^2 is selected from the group consisting of methyl, ethyl, n-propyl, and isopropyl, and therapeutically acceptable salts thereof.

4,053,604

METHOD FOR IMPROVING ANESTHESIA AND COMPOSITIONS THEREFOR

Jorge Jaramillo, Dollard des Ormeaux, Canada, assignor to Ayerst, McKenna & Harrison Limited, Montreal, Canada

Filed Nov. 26, 1975, Ser. No. 635,540
Int. Cl.[2] A61K *31/47, 31/535, 31/02*
U.S. Cl. 424—258 **14 Claims**



1. A method for preventing painful conditions and providing psychic indifference to pain and stress in an animal subject comprising:

administering concomitantly or sequentially to said subject a neuroleptanalgesically effective dose comprising (+)(4a, 13b-trans)-(3-hydroxy,13b-trans)-3-isopropyl-2,3,4,4a,8,9,-13b,14-octahydro-1lH-benzo[6,7]cyclohepta[1,2,3-de]-pyrido[2,1-a]isoquinolin-3-ol, or

a therapeutically acceptable acid addition salt thereof, and less than a normally effective amount of a therapeutically acceptable analgesic agent or a therapeutically acceptable acid addition salt thereof, in a ratio ranging from 1 : 1 to 100:1 on a weight to weight basis, respectively.

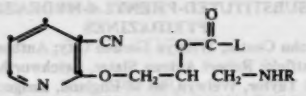
4,053,605

ESTERIFIED-2(3-LOWER-ALKYL-AMINO-PROPOXY)-3-CYANO-PYRIDINES AND DERIVATIVES

John J. Baldwin, Lansdale, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed June 15, 1976, Ser. No. 696,236
Int. Cl.[2] C07D *213/57;* A61K *31/395*
U.S. Cl. 424—263 **14 Claims**

1. A compound having the formula:



wherein

R is C_3–C_4 branched alkyl

L is selected from C_1–C_{10} alkyl, phenyl, mono- and disubstituted phenyl wherein said substituents are independently selected from C_1–C_4 alkyl, C_1–C_4 alkoxy and halo,

and pharmaceutically acceptable salts thereof.

13. A method of treating hypertension in hypertensive humans which comprises oral, inhalation, suppository or parenteral administration of an effective amount of a compound of claim **1.**

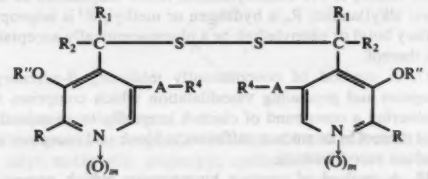
4,053,606

MERCAPTOALKYLPYRIDINE DISULFIDES

Tsung-Ying Shen, Westfield; Howard Jones, Holmdel, and Conrad P. Dorn, Plainfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 578,692, May 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 464,011, April 26, 1974, abandoned, which is a continuation-in-part of Ser. No. 368,772, June 15, 1973, abandoned. This application July 16, 1976, Ser. No. 706,034
Int. Cl.[2] C07D *213/32;* A61K *31/44*
U.S. Cl. 424—263 **12 Claims**

1. A compound of structural formula:

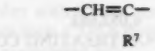


or pharmaceutically acceptable salt thereof wherein

m is 0 or 1;

R″ is H or C_{2-6} alkanoyl;

A is



or $-C{\equiv}C-$,

where

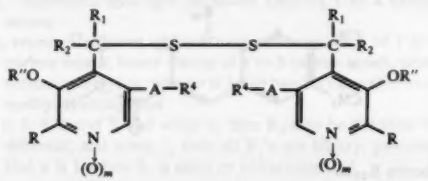
R^7 is hydrogen, chloro or fluoro;

R is C_{1-3} alkyl, hydroxy, C_{2-6} alkanoyloxy or hydroxy-C_{1-3} alkyl;

R^1 and R^2 are hydrogen or C_{1-3} alkyl; and

R^4 is hydrogen, C_{1-3} alkyl, phenyl, chloro or fluoro

9. A method of treating rheumatoid arthritis which comprises the administration, to a warm-blooded animal or human in need of such treatment, an effective amount of a compound of structural formula:



4,053,607

ARYLOXYPYRIDINE FOR TREATING HYPERGLYCAEMIA

David Edward Thorne, Cranleigh, England, and Kurt Engel, Basel, Switzerland, assignors to Beecham Group Limited, England

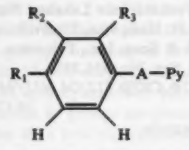
Continuation of Ser. No. 481,985, June 24, 1974, abandoned, which is a division of Ser. No. 346,252, March 30, 1973, abandoned. This application June 13, 1975, Ser. No. 586,817

Claims priority, application United Kingdom, Apr. 4, 1972, 15280/72

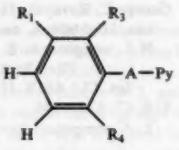
Int. Cl.[2] A61K *31/44*

U.S. Cl. 424—263 47 Claims

1. A pharmaceutical composition for the treatment of hyperglycaemia in humans in the form of a beverage, foodstuff, tablet, linguet, powder, capsule, slurry, troche, lozenge or syrup or in a form suitable for administration to humans which comprises a blood sugar lowering amount of a compound of the formula



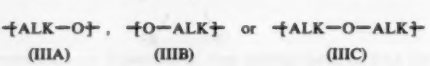
(I)



(II)

or a pharmaceutically-acceptable, non-toxic acid addition salt thereof, wherein Py is 2-, 3- or 4-pyridyl unsubstituted or substituted by lower alkyl;

A is a group of the formula



(IIIA) (IIIB) (IIIC)

wherein ALK is straight or branched chain alkylene of 1 to 6 carbon atoms; R_1 is a carboxylic acid group or a group which is converted in the human body to a carboxylic acid group; and R_2, R_3, and R_4 are each hydrogen, a carboxylic acid group, a group which is converted in the human body to a carboxylic acid group, lower alkanoyl, hydroxyl, lower alkoxy, hydroxymethyl, nitro, halo or amino, provided that R_1 is not methyl, cyano, or methoxycarbonyl when Py is 2-pyridyl or 5-ethylpyridyl-2-yl and A is —O-CH_2— and R_2, R_3 and R_4 are hydrogen or halo, in combination with a pharmaceutically-acceptable non-toxic, inert diluent or carrier therefor.

4,053,608

COMPOSITIONS AND METHODS FOR THE TREATMENT OF COCCIDIOSIS

Yasuhiro Morisawa; Mitsuru Kataoka; Noritoshi Kitano, and Toshiaki Matsuzawa, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Filed Aug. 7, 1975, Ser. No. 602,574

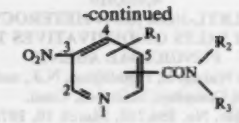
Claims priority, application Japan, Aug. 14, 1974, 49-93011; Aug. 14, 1974, 49-93012; Aug. 24, 1974, 49-97258; Dec. 26, 1974, 50-1695; Jan. 11, 1975, 50-5676; Feb. 27, 1975, 50-24207; Mar. 12, 1975, 50-29940; Apr. 12, 1975, 50-44518

Int. Cl.[2] A61K *31/455, 31/44*

U.S. Cl. 424—266 26 Claims

1. An anticoccidial composition containing a minor amount, sufficient for the treatment of coccidiosis, which comprises a compound having the formula

-continued



(I)

intimately dispersed in an inert edible carrier, wherein

R_1 is hydrogen atom, a halomethyl group or methyl group;

R_2 is hydrogen atom or an alkyl group of 1–3 carbon atoms;

R_3 is hydrogen atom, an alkyl group of 1–3 carbon atoms, allyl group, an alkyl group having 2 or 3 carbon atoms and alkoxy of 1 or 2 carbon atoms as a substituent, an alkyl group having 1–3 carbon atoms and hydroxy as a substituent, an alkanoyl group of 1–18 carbon atoms, a haloacetyl group, an alkenoyl group of 3–11 carbon atoms, an aromatic acyl group selected from the group consisting of benzoyl, 2,3-dimethoxybenzoyl, 3,4-dimethoxybenzoyl, 3,5-dimethoxybenzoyl, o-, m-, p-toluoyl, o-, m-, p-chlorobenzoyl, o-, m-, p-bromobenzoyl, p-methoxybenzoyl, o-, m-, p-acetylaminobenzoyl, o-, m-, p-cyanobenzoyl, 2-ethoxy-4-acetylaminobenzoyl, 2-ethoxy-4-dimethylaminobenzoyl, 2-methoxy-4-acetylaminobenzoyl, 3,5-dimethylbenzoyl, and 3,4-dimethylbenzoyl, a heterocyclic acyl group selected from the group consisting of 2-furoyl, 2-thenoyl, isonicotinoyl, nicotinoyl, 5-nitronicotinoyl and 2-methyl-5-nitronicotinoyl, an N-alkylcarbamoyl group of 1–4 carbon atoms in the alkyl moiety or hydroxy group;

or an inorganic acid addition salt thereof;

provided that when R_2 is said alkyl group of 1–3 carbon atoms, R_3 is said alkyl group of 1–3 carbon atoms, and provided that the compound of formula (I) is not defined by a methyl group at the 6-position and a —$CONH_2$ group at the 5-position.

4,053,609

PENICILLINS AND PROCESSES FOR PREPARING THE SAME

Mitsutaka Kawazu; Mitsuyoshi Wagatsuma, both of Urawa; Masahiko Seto, Asaka; Toshikazu Miyagishima, Wako; Totaro Yamaguchi, Yono, and Satoshi Ohshima, Iwatsuki, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

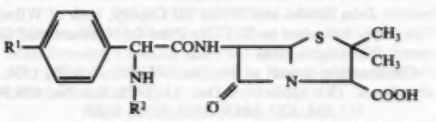
Filed Aug. 5, 1976, Ser. No. 711,858

Claims priority, application United Kingdom, Sept. 12, 1975, 37525/75; Japan, Dec. 27, 1975, 50-157873; Dec. 27, 1975, 50-157874; Dec. 29, 1975, 50-157920

Int. Cl.[2] C07D *499/68;* A61K *31/43*

U.S. Cl. 424—271 43 Claims

1. A compound of the formula:



wherein R^1 is hydrogen or hydroxy, R^2 is a group of the formula: —CO-$CH(NH_2)$—CH_2COR^3 or —$COCH_2$-$CH(NH_2)$-COR^3, and R^3 is selected from the group consisting of hydroxy, lower alkylamino, di-lower alkylamino, lower alkoxy and hydroxy-lower alkylamino, or R^3 is amino when R^1 is hydroxy, or a pharmaceutically acceptable salt thereof.

4,053,610

1,2-DIALKYL-3(OR 3,5)-N-HETEROCYCLIC PYRAZOLIUM SALTS OR DERIVATIVES THEREOF AS FUNGICIDAL AGENTS

Bryant Leonidas Walworth, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 556,748, March 10, 1975, Pat. No. 3,970,754. This application June 9, 1976, Ser. No. 694,268

Int. Cl.[2] A01N *9/22*

U.S. Cl. 424—273 P **2 Claims**

1. A method for protecting plants from attack by fungi comprising applying to said plants a fungicidally effective amount of 1,2-dimethyl-3-phenyl-5-(1-pyrrolidinyl)pyrazolium methyl sulfate.

4,053,611

SUBSTITUTED PHENOXYALKYL QUATERNARY AMMONIUM COMPOUNDS AS ANTIARRHYTHEMIC AGENTS

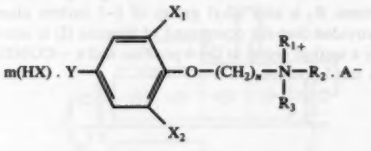
Stanley J. Strycker, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 484,525, July 1, 1974, Pat. No. 3,932,664, which is a division of Ser. No. 164,086, July 19, 1971, Pat. No. 3,875,215. This application Jan. 12, 1976, Ser. No. 648,548

Int. Cl.[2] A61K *31/40*

U.S. Cl. 424—274 **8 Claims**

5. A method for combatting cardiac arrhythmias which comprises administering to an animal a cardiac antiarrhythmic amount of a quaternary ammonium compound coresponding to the formula



wherein Y represents amino, loweralkylamino or diloweralkylamino; R_1 and R_2 taken together represent an aliphatic hydrocarbon moiety of 4 carbon atoms substituted with zero, one or two lower alkyl substitutents; R_3 independently is selected from the group consisting of lower alkenyl, phenacyl, mono-, di-, or trihalophenacyl, lower alkynyl, substituted lower alkyl, substituted lower alkenyl and substituted lower alkynyl substituted with a substituent selected from the group consisting of halogen, phenyl, halophenyl, dihalophenyl, trihalophenyl, nitrilo, and hydroxy; X_1 and X_2 both represent halogen; A^- represents a stiochiometric equivalent quantity of a pharmaceutically-acceptable anion; n represents one of the integers 2, 3 or 4; HX represents a stiochiometric equivalent quantity of a pharmaceutically-acceptable acid; and m represents one of the integers zero and one.

4,053,612

STABILIZED FORMULATIONS OF 2-ALKOXYIMINO-N-CARBAMOYL-2-CYANOACETAMIDES

Frederic John Baude, and Willis Eli Cupery, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

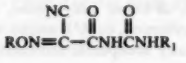
Continuation-in-part of Ser. No. 545,605, Jan. 30, 1975, abandoned. This application Dec. 12, 1975, Ser. No. 639,581

Int. Cl.[2] A01N *9/02, 9/12, 9/20*

U.S. Cl. 424—286 **11 Claims**

9. A fungicidal composition consisting essentially of

a. 10 parts of a compound of the formula



wherein

R is methyl or ethyl, and

R_1 is hydrogen, alkyl of 1 to 4 carbon atoms or allyl;

b. a fungicidally effective amount of a fungicide selected from the group consisting of maneb and mancozeb;

c. from 1 to 100 parts of an acidulent having a pH of 2 to 5.7 in a 1% distilled water mixture and a free acidity of from 2.5 millimoles per gram to 22 millimoles per gram of acidulent when titrated in a 1% distilled water mixture to a pH of 7

with the proviso that when the composition contains maneb, said acidulent includes a zinc salt selected from the group consisting of zinc chloride, zinc sulfate and zinc nitrate in which the mole ratio of zinc salt to maneb is from 2 to 15 percent.

4,053,613

1,3,4,5,15,THIAZOLINYL AND 1,3 THIAZINYL SUBSTITUTED INDOLINONES

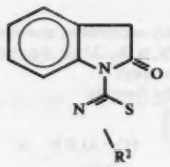
George C. Rovnyak, Hopewell; Venkatachala Lakshmi Narayanan, Hightstown, and Rudiger D. Haugwitz, Titusville, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sept. 17, 1975, Ser. No. 614,393

Int. Cl.[2] A61K *31/425, 31/54*; C07D *417/04, 417/14*

U.S. Cl. 424—246 **16 Claims**

1. A compound having the formula



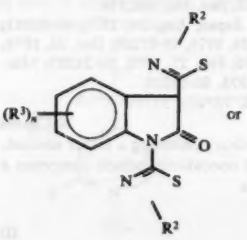
wherein R^2 is hydrogen, and the radical

represents a 5- or 6-membered ring containing three or four carbons and one double bond; and pharmaceutically acceptable acid-addition salts thereof.

3. A pharmaceutical composition comprising a compound as defined in claim **1** and a pharmaceutically acceptable carrier therefor.

4. A method of treating inflammation in mammalian species, which comprises orally administering to a mammalian host a therapeutic amount of a composition as defined in claim **3**.

5. A compound having the formula



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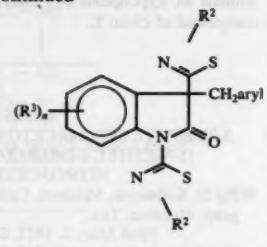


wherein R^2 is selected from the group consisting of hydrogen, lower alkyl, phenyl or lower alkylphenyl; R^3 is selected from the group consisting of hydrogen, lower alkyl, trifluoromethyl, halo, lower alkoxy, nitro, cyano, amino, di-lower alkylamino or

wherein R contains less than 11 carbons and is selected from the group consisting of lower alkyl, lower alkenyl, phenyl, phenyl-lower alkyl, cycloakyl, cycloalkenyl, cycloalkyl-lower alkyl, and cyclo-lower alkenyl, however where *n* is 2, and adjacent R^3 groups are present, at least one of the R^3 groups is other than t-butyl, trifluoromethyl or nitro; aryl is phenyl or phenyl mono-substituted with a member selected from the group consisting of halogen, lower alkyl, nitro, trifluoromethyl, and lower alkoxy; *n* is 1 or 2; the radical

represents a 5- or 6-membered ring having three or four carbons and one double bond; and pharmaceutically acceptable acid-addition salts thereof.

15. A pharmaceutical composition comprising a compound as defined in claim **5** and a pharmaceutically acceptable carrier therefor.

4,053,614

1,2-PENTAMETHYLENE-1,4-DIHYDROPYRIDINE DERIVATIVES

Horst Meyer; Friedrich Bossert, both of Wuppertal-Elberfeid; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal-Vohwinkel, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

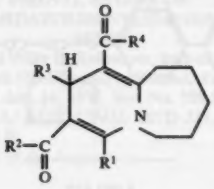
Division of Ser. No. 468,664, May 10, 1974, Pat. No. 3,951,988, which is a division of Ser. No. 336,477, Feb. 28, 1973, Pat. No. 3,856,798. This application Aug. 13, 1975, Ser. No. 604,352

Claims priority, application Germany, Mar. 6, 1972, 2210633

Int. Cl.² A61K *31/455*

U.S. Cl. 424—266 **35 Claims**

18. A method of producing coronary vessel dilation and an antihypertensive effect in humans and other animals which comprises administering to said human or other animal a compound of the formula:



wherein R^1 is hydrogen or lower alkyl;

each of R^2 and R^4, independently of the other, is lower alkoxy or alkynyloxy of 2 to 4 carbon atoms; and

R^3 is lower alkyl; phenyl; phenyl substituted by one to three substituents selected from the group consisting of lower alkyl, trifluoromethyl, cyano, halo, nitro and carbo(lower alkoxy); pyridyl; furyl; thienyl; or naphthyl;

in an amount sufficient to produce coronary vessel dilation and an antihypertensive effect.

4,053,615

PHTHALIMIDOPIPERIDINES AND ANTI-CONVULSANT COMPOSITIONS THEREOF

John Terence Arnott Boyle, and John Christopher Saunders, both of Maidenhead, England, assignors to John Wyeth & Brother Limited, Maidenhead, England

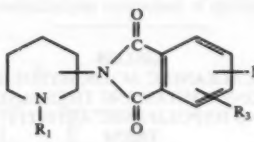
Continuation-in-part of Ser. No. 543,397, Jan. 23, 1975, abandoned, which is a continuation-in-part of Ser. No. 405,332, Oct. 11, 1973, abandoned. This application Jan. 21, 1976, Ser. No. 650,828

Claims priority, application United Kingdom, Oct. 21, 1972, 48594/72; Jan. 23, 1975, 2923/75

Int. Cl.² C07D *401/04*

U.S. Cl. 424—267 **21 Claims**

1. A compound selected from those having the formula



and their pharmaceutically acceptable acid addition salts, wherein R_1 is selected from the group consisting of hydrogen, lower alkyl, cycloalkyl of 5 to 7 carbon atoms, phenyl(lower-)alkyl, pyridyl(lower)alkyl, furyl(lower)alkyl and thienyl(lower)alkyl, and R_2 and R_3 are independently selected from the group consisting of hydrogen, halogen, lower alkyl, nitro, amino and di(lower alkyl)amino.

4,053,616

COMBATING RUST FUNGI WITH 1-[1',2',4'-TRIAZOLYL-(1')]-1-(4'-PHENYL-PHENOXY)-3,3-DIMETHYL-BUTAN-2-ONE

Karl Heinz Büchel; Wolfgang Krämer, both of Wuppertal; Wilhelm Brandes, Cologne, and Paul-Ernst Frohberger, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

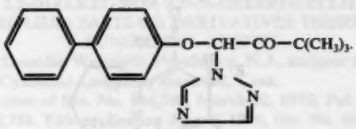
Filed June 11, 1975, Ser. No. 586,122

Claims priority, application Germany, June 28, 1974, 2431073

Int. Cl.² A01N *9/22*

U.S. Cl. 424—269 **5 Claims**

1. A method of combating rust fungi of the genus Uromyces and Puccinia which comprises applying to the rust fungi or to seed a rust fungicidally effective amount of the compound of the formula



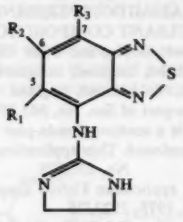
4,053,617

2,1,3-BENZOTHIADIAZOLES AS MYOLONOLYTICS

Erwin Eichenberger, Gumligen, and Peter Neumann, Berne, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed July 26, 1976, Ser. No. 708,621
Claims priority, application United Kingdom, July 28, 1975, 31585/75
Int. Cl.² A61K *31/425*
U.S. Cl. 424—270 16 Claims

1. A method of treating spastic conditions which comprises administering to an animal in need of such treatment a therapeutically effective amount of a compound of the formula



wherein each of R_1, R_2 and R_3 independently, is hydrogen, halogen, alkyl, alkoxy, nitro, cyano, hydroxy or alkylthio, or a pharmaceutically acceptable acid addition salt form thereof.

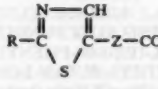
4,053,618

THIAZOLE ALKANOIC ACIDS, HYPOLIPEMIANT COMPOSITIONS CONTAINING THEM AND METHODS OF INDUCING HYPOLIPEMIC ACTIVITY UTILIZING THEM

Andre Poittevin, Vaires-sur-Marne, and Vesperto Torelli, Maisons-Alfort, both of France, assignors to Roussel-UCLAF, Paris, France

Filed Feb. 2, 1976, Ser. No. 654,514
Claims priority, application France, Dec. 12, 1975, 75.38061
Int. Cl.² A61K *31/425*; C07D *277/30*; C07F *5/06*
U.S. Cl. 424—270 15 Claims

1. A compound selected from the group consisting of thiazoles of the formula



wherein R is alkyl of 1 to 5 carbon atoms, Z is selected from the group consisting of —CH=CH—, —CH=CH—CH=CH— and $—(CH_2)_n—$, n is an integer of 2, 4, or 6 and R_1 is selected from the group consisting of hydrogen, alkyl of 1 to 5 carbon atoms, $—NH_4$ and alkali metal, alkaline earth metal and aluminum cations and the non-toxic, pharmaceutically acceptable acid addition salts.

10. A hypolipemiant composition comprising an effective amount of at least one compound of claim 1 and a pharmaceutical carrier.

11. A method of inducing hypolipemic activity in warm-blooded animals comprising administering to warm-blooded animals an hypolipemically effective amount of at least one compound of claim 1.

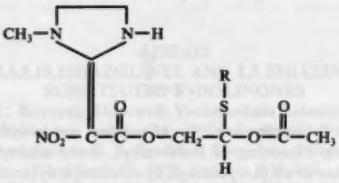
4,053,619

2-SUBSTITUTED-2-(ACETOXYETHYL) ESTERS OF (1-METHYL-2-IMIDAZOLIDINYLIDENE) NITROACETIC ACID

Willy D. Kollmeyer, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 2, 1977, Ser. No. 773,452
Int. Cl.² C07D *233/26*; A61K *31/415*
U.S. Cl. 424—273 R 4 Claims

1. A compound of the formula:



wherein R is alkyl of one to four carbon atoms, or is phenyl or phenyl substituted by from one to three halogen atoms or by one of nitro, cyano, alkyl, mono- and polyhaloalkyl, alkoxy or alkylthio, wherein the alkyl moiety contains from one to six carbon atoms.

4. A method for killing insects which comprises contacting them with a lethal dosage of a compound of claim 1.

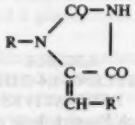
4,053,620

COMBATING FUNGI WITH 1-ARYL-5-ALKYLIDENE-2,4-DIOXO-IMIDAZOLIDINES

Edgar Enders, Cologne, and Paul-Ernst Frohberger, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

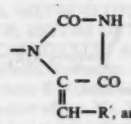
Filed Mar. 19, 1976, Ser. No. 668,547
Claims priority, application Germany, Apr. 5, 1975, 2514992
Int. Cl.² A01N *9/22*
U.S. Cl. 424—273 R 11 Claims

1. A method of combating fungus pests which comprises applying to the pests or a habitat thereof a fungicidally effective amount of a compound of the formula



in which

R is phenyl or naphthyl; or phenyl or naphthyl substituted by nitro; by halogen; by alkyl, alkoxy, alkylthio, alkylsulfinyl or alkylsulfonyl each with up to 6 carbon atoms; by haloalkyl with up to 5 halogen atoms and 1 or 2 carbon atoms; by cycloalkyl with 5 or 6 carbon atoms; by hydroxyl; by cyano; by thiocyanato; by acetyl; by formyl; by phenyl or phenoxy each optionally carrying halogen or nitro as substituents; by phenylthio; by phenylsulfonyl; by halosulfonyl; by benzyl; by anilino; by monoalkylamino or dialkylamino, each with up to 4 carbon atoms in each alkyl moiety; or by



R' is hydrogen or alkyl with up to 6 carbon atoms.

4,053,621

1-[2-(βNAPHTHYLOXY)ETHYL]-3-METHYLPYRAZOLONE-(5) AND ANTITHROMBOTIC AND ANTITHROMBOLYTIC COMPOSITIONS AND METHODS UTILIZING THEM

Eike Moller, Wuppertal, Germany; Karl Meng, deceased, late of Wuppertal, Germany, by Ilse Heide Frieda Meng, heir; Harald Horstmann, Wuppertal, Germany; Friedel Seuter, Germany, and Egbert Wehinger, both of Neviges, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed June 2, 1975, Ser. No. 582,773

Claims priority, application Germany, June 6, 1974, 2427272

Int. Cl.² A61K *31/295, 31/415;* **C07D** *231/08;* **C07F** *15/02*

U.S. Cl. 424—273 P **16 Claims**

1. 1-[2-(β-naphthyloxy)ethyl]-3-methylpyrazolone-(5) or a pharmaceutically acceptable nontoxic salt thereof.

4. A pharmaceutical composition useful for inhibiting thrombus formation and for reducing or redissolving a thrombus in humans and animals which comprises an antithrombotically effective amount or an antithrombolytically effective amount of a compound according to claim **1** in combination with a pharmaceutically acceptable carrier or diluent.

5. An alkali metal, alkaline earth metal, aluminum, iron or organic base salt of 1-[2-(β-naphthyloxy)ethyl]-3-methylpyrazolone-(5) according to claim **1.**

4,053,622

PHENYL ESTERS OF 3-METHYL-2-(1-NITRO-2-OXO-2-PHENOXYETHYLIDENE)-1-IMIDAZOLIDINECARBOXYLIC ACIDS

Willy D. Kollmeyer, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

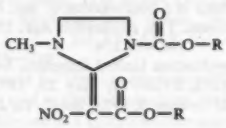
Filed Jan. 14, 1977, Ser. No. 759,596

Int. Cl.² A61K *31/415;* **C07D** *233/40*

U.S. Cl. 424—273 R **3 Claims**

1. A compound of the formula:

(I)



wherein both of R are the same and are phenyl or phenyl substituted by from one to three halogen atoms or by one of nitro, cyano, alkyl, mono- and polyhaloalkyl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl and alkanoyl, wherein the alkyl moiety contains from one to six carbon atoms.

3. A method for killing insects which comprises contacting them with a lethal dosage of a compound of claim **1.**

4,053,623

PHENYL ESTERS OF (1-METHYL-2-IMIDAZOLIDINYLIDENE)NITROACETIC ACIDS

Paul E. Porter, and Willy D. Kollmeyer, both of Modesto, Calif., assignors to Shell Oil Company, Houston, Tex.

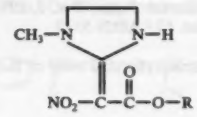
Filed Jan. 14, 1977, Ser. No. 759,599

Int. Cl.² A61K *31/415;* **C07D** *233/22*

U.S. Cl. 424—273 R **3 Claims**

1. A compound of the formula:

(I)



wherein R is phenyl or phenyl substituted by from one to three halogen atoms or by one of nitro, cyano, alkyl, mono- and polyhaloalkyl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl and alkanoyl, wherein the alkyl moiety contains from one to six carbon atoms.

3. A method for killing insects which comprises contacting them with a lethal dosage of a compound of claim **1.**

4,053,624

INDOLE-2-CARBALDEHYDE COMPOUNDS AND BLOOD SUGAR REDUCING COMPOSITIONS

Manfred Hubner, Ludwigshafen (Rhine); Ruth Heerdt, Mannheim-Feudenheim; Felix Schmidt, Mannheim-Seckenheim, and Max Thiel, Mannheim, all of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Germany

Filed Apr. 30, 1975, Ser. No. 573,214

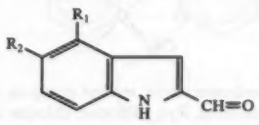
Claims priority, application Germany, May 31, 1974, 2426439

Int. Cl.² A61K *31/40;* **C07D** *209/12*

U.S. Cl. 424—274 **15 Claims**

1. Indole-2-carbaldehyde compound of the formula:

(I)



wherein

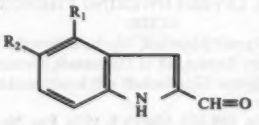
R_1 is lower alkyl of up to 5 carbon atoms and

R_2 is hydrogen, halogen or lower alkyl or alkoxy with the proviso that when R_2 is ethyl, R_1 may be hydrogen

and the physiologically compatible aldehyde derivatives thereof.

12. Method of depressing blood sugar in the subject which method comprises administering to such subject an effective amount of indole-2-carbaldehyde compound of the formula:

(I)



wherein

R_1 is lower alkyl or hydrogen and

R_2 is hydrogen, halogen or lower alkyl or alkoxy with the proviso that when R_2 is other than halogen or ethyl, R_1 is alkyl,

and the physiologically compatible aldehyde derivatives thereof.

4,053,625

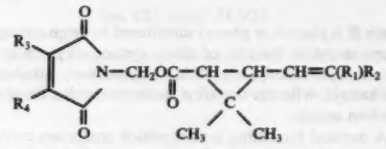
INSECTICIDES

Isao Ono, Kawanishi; Yoshitoshi Okuno, Toyonaka; Toshio Nishioka, Takarazuka, and Nobushige Itaya, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Nov. 24, 1975, Ser. No. 634,850
Claims priority, application Japan, Dec. 5, 1974, 49-140657
Int. Cl.[2] A01N *9/22*
U.S. Cl. 424—274 9 Claims

1. A cyclopropanecarboxylic acid ester of the formula (I),

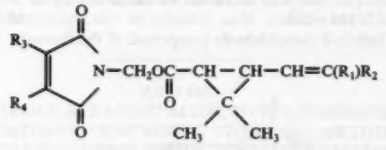
(I)



wherein R_1 is a hydrogen atom, methyl group or a fluorine, chlorine or bromine atom, R_2 is a fluorine, chlorine or bromine atom, and each of R_3 and R_4 is independently a hydrogen atom, a C_1–C_3 alkyl, C_2–C_3 alkenyl or C_2–C_3 alkynyl group, an alkyl- or halogen-substituted C_6–C_8 aryl, unsubstituted C_6–C_8 aryl group or a C_7–C_9 aralkyl group.

7. An insecticidal composition comprising an inert carrier and as the active ingredient an insectidally effective amount of a cyclopropanecarboxylic acid ester of the formula (I),

(I)



wherein R_1 is a hydrogen atom, methyl group or a fluorine, chlorine or bromine atom, R_2 is a fluorine, chlorine or bromine atom, and each of R_3 and R_4 is independently a hydrogen atom, a C_1–C_3 alkyl, C_2–C_3 alkenyl or C_2–C_3 alkynyl group, an alkyl- or halogen-substituted C_6–C_8 aryl or unsubstituted C_6–C_8 aryl group or a C_7–C_9 aralkyl group.

9. A method of killing insect or acarid, which comprises applying thereto an insecticidally effective amount of a compound as claimed in claim 1 alone or together with an inert carrier.

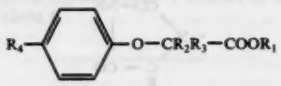
4,053,626

CHOLESTEROL LEVEL-LOWERING PHENOXYACETIC ACIDS

Erich Schacht; Werner Mehrhof; Herbert Nowak; Zdenek Simane, and Detlev Kayser, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschraenkter Haftung, Darmstadt, Germany

Division of Ser. No. 449,332, March 8, 1974, Pat. No. 3,992,386. This application Sept. 17, 1976, Ser. No. 724,232
Claims priority, application Germany, Mar. 13, 1973, 2312344; Apr. 18, 1973, 2319642; May 18, 1973, 2325184
Int. Cl.[2] C07D *311/04;* A61K *31/38*
U.S. Cl. 424—275 8 Claims

1. A compound of the formula



wherein R_1 is H or alkyl of 1–4 carbon atoms, R_2 is H or alkyl of 1–4 carbon atoms, R_3 is methyl, phenyl or chlorophenyl and R_4 is 4-chromanyl or 4-thiochromanyl, or a physiologically acceptable salt thereof.

7. A pharmaceutical composition comprising in unit dosage form a cholesterol blood-level lowering amount of at least one compound of claim 1 in admixture with a pharmaceutically acceptable carrier.

8. A method for lowering the cholesterol blood levels in mammalian patients having abnormally high cholesterol levels which comprises administering to the patient doses of a compound of claim 1 effective to significantly lower cholesterol level of the patient.

4,053,627

CONTROLLED RELEASE SYSTEM FOR JUVENILE HORMONES IN AQUEOUS ENVIRONMENT

Herbert B. Scher, Moraga, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Sept. 10, 1975, Ser. No. 612,129
Int. Cl.[2] A01N *9/28*
U.S. Cl. 424—278 3 Claims

1. A method for the controlled release and protecting of an insect juvenile hormone from chemical degradation when said hormone is applied to an aqueous environment employing gel discs, said discs comprising a water soluble algin, a calcium salt which yields cations which gelatinize alginates, a solubilizing agent to control gel formation, a biocidally effective amount of a biocide to protect said discs from attack by microorganisms and an insect juvenile hormone.

4,053,628

COMPOSITION

Neil Arthur Stevenson, and George Wardell, both of Loughborough, England, assignors to Fisons Limited, London, England

Division of Ser. No. 471,141, May 17, 1974, Pat. No. 3,975,536, which is a continuation-in-part of Ser. No. 443,521, Feb. 19, 1974, abandoned, which is a continuation of Ser. No. 251,198, May 8, 1972, abandoned. This application Apr. 15, 1976, Ser. No. 677,274
Claims priority, application United Kingdom, May 12, 1971, 14529/71; Dec. 9, 1971, 57169/71; May 25, 1973, 25237/73; May 25, 1973, 25238/73; June 5, 1973, 26649/73; July 12, 1973, 33325/73
Int. Cl.[2] A61K *31/35*
U.S. Cl. 424—283 6 Claims

1. A method of treatment of conditions of the eye or nose, in which conditions allergy or immune reactions play a contributory part, which method comprises administration of 1,3-bis(2-carboxychromon-5 -yloxy)propan-2-ol, or a pharmaceutically acceptable salt thereof, topically or by sub-conjunctival injection to a patient having such a condition.

4,053,629

INSECTICIDAL METHOD UTILIZING CERTAIN COUMARANOL ESTERS OF CYCLOPROPANE CARBOXYLIC ACIDS

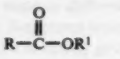
Wayne I. Fanta, Colerain Township, Hamilton County, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

and a continuation-in-part of Ser. No. 208,040, Dec. 9, 1971, Pat. No. 3,976,663, which is a continuation-in-part of Ser. No. 2,443, Jan. 12, 1970, abandoned. This application June 28, 1976, Ser. No. 700,425

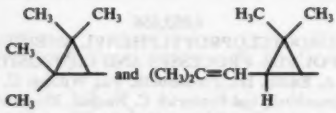
Int. Cl.[2] A01N *9/28*

U.S. Cl. 424—285 5 Claims

1. A method for combatting insects comprising applying to said insects, or to an insect habitat, an insecticidal amount of cyclopropanecarboxylic acid ester of the formula



wherein R is a cyclopropane moiety selected from the group consisting of



and wherein R^1 is a 3-coumaranyl moiety of the formula

wherein R^2 is selected from the group consisting of hydrogen, halogen, nitro, thiomethyl, alkyl, alkoxyl, sulfonylmethyl, phenyl and benzyl.

4,053,630

TREATMENT OF BODY ODOR AND DISTURBED KERATINIZATION

Ruey J. Yu, 4400 Dexter St., Philadelphia, Pa. 19128, and Eugene J. Van Scott, 1138 Sewell Lane, Rydal, Pa. 19046

Filed July 7, 1976, Ser. No. 703,188

Int. Cl.[2] A61K *31/315*

U.S. Cl. 424—289 11 Claims

1. A method for treating acne, dandruff and ichthyotic skin conditions, said method comprising topically applying to the involved skin are as a symptom alleviating and therapeutically effective amount of a medicinal composition containing from about 1 to about 30 percent by weight of at least one compound selected from the group consisting of cysteic acid, cysteinesulfinic acid and homocysteic acids and chelates of said compound with at least one metallic compound selected from the group consisting of ferric chloride, copper sulfate, copper carbonate, zinc sulfate, zinc oxide, zinc chloride, aluminum chlorohydrate and aluminum zinc sulfate.

4,053,631

SYSTEMIC CONTROL OF ECTOPARASITES WITH α-CYANO-M-PHENOXYBENZYL α-C_1–C_4 ALKYL-2-NAPHTHALENEACETATES

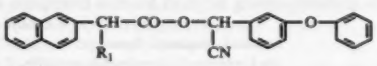
Michael Stanley Schrider, South Bound Brook, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Apr. 2, 1976, Ser. No. 673,246

Int. Cl.[2] A61K *31/275*

U.S. Cl. 424—304 10 Claims

1. A method for the systemic control of ectoparasites which attack warm-blooded animals, comprising administering to the warm-blooded animals a systemically effective amount against the ectoparasites of a compound having a formula:



wherein R_1 is alkyl C_1–C_4.

4,053,632

COMPOUNDS OF SPIRO-AMINE TYPE AND METHODS FOR THEIR USE

Bernt Sigfrid Emanuel Carnmalm, Sodertalje; Tomas De Paulis, Gnesta; Svante Bertil Ross, Sodertalje; Sten Ingvar Rämsby, Sodertalje; Nils-Erik Stjernström, Sodertalje, and Sven-Ove Ögren, Sodertalje, all of Sweden, assignors to Astra Lakemedel Aktiebolag, Sodertalje, Sweden

Continuation-in-part of Ser. No. 256,945, May 25, 1972, Pat. No. 3,904,691. This application Dec. 27, 1974, Ser. No. 536,810

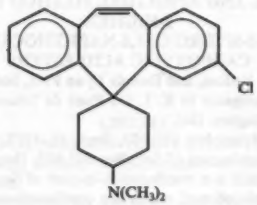
Claims priority, application Sweden, June 11, 1971, 717630

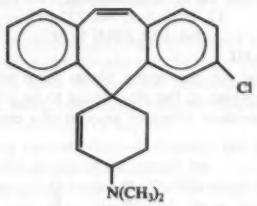
The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.

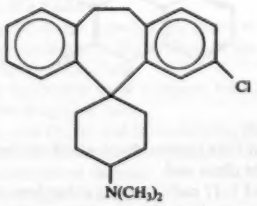
Int. Cl.[2] A01N *9/20*

U.S. Cl. 424—316 19 Claims

1. A compound selected from the group consisting of







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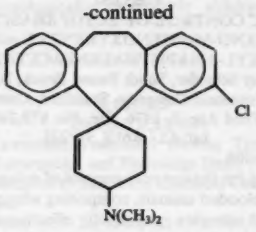


and pharmaceutically acceptable salts thereof.

4,053,633

ARYL DIBROMONITROMETHYL SULFONES

Christian T. Goralski, and Thomas C. Klingler, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed June 24, 1976, Ser. No. 699,546
Int. Cl.[2] A01N *9/00;* C07C *147/06*
U.S. Cl. 424—337 6 Claims

1. A method for controlling bacteria and fungi by applying to them and to their habitats a cidal amount of a solution containing at least 100 parts per million of an aryl dibromonitromethyl sulfone, wherein aryl represents phenyl or C_{1-4} alkyl-substituted phenyl.

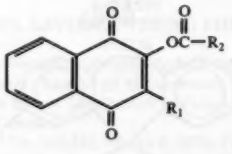
4,053,634

MITICIDAL AND APHICIDAL METHOD UTILIZING 2-HIGHER ALKYL-3-HYDROXY-1,4-NAPHTHOQUINONE CARBOXYLIC ACID ESTERS

Russell Frank Bellina, and Dennis Lynn Fost, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 613,553, Sept. 15, 1975, which is a continuation-in-part of Ser. No. 531,483, Dec. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 494,294, Aug. 2, 1974, abandoned, which is a continuation-in-part of Ser. No. 468,692, May 10, 1974, abandoned. This application Sept. 13, 1976, Ser. No. 722,513
Int. Cl.[2] A01N *9/24*
U.S. Cl. 424—312 7 Claims

1. A method for protecting plants from mites or aphids comprising applying to the plant locus to be protected a miticidally or aphicidally effective amount of a compound of the formula:



wherein

R_1 is alkyl of 8–14 carbon atoms which are branched, cyclic, or straight chain and

R_2 is alkyl of 7–17 carbon atoms either branched or straight chain or cycloalkyl of 3–6 carbon atoms.

4,053,635

SUBSTITUTED AMIDES OF 3-METHYL-4-PHENYL-3-BUTENOIC ACID, WITH A HIGH HYPOLIPEMIZING ACTIVITY

Sergio Gorini, and Umberto Valcavi, both of Milan, Italy, assignors to Istituto Biochimico Italiano di Loredana Lorenzini S.a.s., Milan, Italy

Filed June 6, 1975, Ser. No. 584,490
Claims priority, application Italy, June 10, 1974, 23797/74
Int. Cl.[2] C07C *103/76;* A61K *31/165*
U.S. Cl. 424—324 2 Claims

1. A method of treating hypolipemia in a hypolipemic patient which comprises administering to said patient an effective amount of the diethylamide of 3-methyl-4-phenyl-3-butenoic acid.

2. Diethylamide of 3-methyl-4-phenyl-3-butenoic acid.

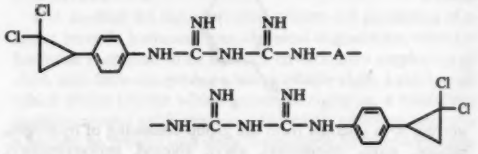
4,053,636

DICHLOROCYCLOPROPYLPHENYL BISBIGUANIDE COMPOUNDS, PROCESSES AND COMPOSITIONS

Frederic A. Eustis, III, Portsmouth, Va.; William G. Gorman, East Greenbush, and Frederick C. Nachod, Kinderhook, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed May 24, 1976, Ser. No. 689,260
Int. Cl.[2] C07C *129/16;* A61K *31/155*
U.S. Cl. 424—326 8 Claims

1. 1,1′-A-bis(5-(p-(2,2-dichlorocyclopropyl)phenyl)biguanide) having the structural formula



wherein A is alkylene of two to twelve carbon atoms having the valence bonds attached to different carbon atoms or an acid addition salt thereof.

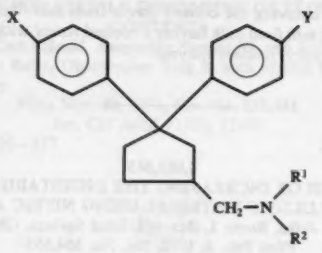
4,053,637

COMPOUNDS OF DIPHENYLCYCLOPENTYLAMINE TYPE AND METHODS FOR THEIR USES

Bernt Sigfrid Emanuel Carnmalm; Ulf Henrik Anders Lindberg, both of Sodertalje; Tomas de Paulis, Gnesta; Svante Bertil Ross, Sodertalje; Nils-Erik Stjernstrom, Sodertalje; Carl Bengt Johan Ulff, Sodertalje, and Sven-Ove Ogren, Sodertalje, all of Sweden, assignors to Astra Lakemedal Aktiebolag, Sodertalje, Sweden

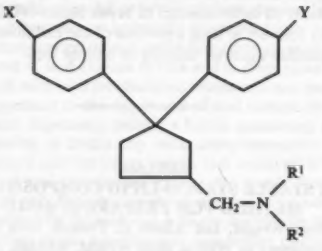
Continuation of Ser. No. 257,707, May 30, 1973, abandoned. This application May 20, 1975, Ser. No. 579,049
Claims priority, application Sweden, June 11, 1971, 7631/71
Int. Cl.[2] A01N *9/20, 9/24*
U.S. Cl. 424—330 18 Claims

1. A pharmaceutical preparation for selectively blocking noradrenaline uptake by adrenergic nerve terminals, said preparation containing as an active ingredient an effective amount of a compound having the structural formula



or a pharmaceutically acceptable acid addition salt thereof, wherein X and Y are the same or different and each represents a member selected from the group consisting of a hydrogen atom, a chloro group and a methoxy group; and R^1 and R^2 are the same or different and each represents a member selected from the group consisting of a hydrogen atom and a methyl group, together with a pharmaceutically acceptable carrier.

9. A compound of the formula



wherein X and Y are the same or different and each represents a member selected from the group consisting of a hydrogen atom, a chloro group or a methoxy group; and R^1 and R^2 are the same or different and each represents a member selected from the group consisting of a hydrogen atom and a methyl group, and pharmaceutically acceptable acid addition salts thereof.

4,053,638

ANTICARIES CONFECTIONERIES AND ORAL HEALTH PRODUCTS

John H. Litchfield, Worthington, and Victor G. Vely, Columbus, both of Ohio, assignors to William Wrigley Jr. Company, Chicago, Ill.

Division of Ser. No. 35,246, May 6, 1970, which is a continuation-in-part of Ser. No. 855,763, Sept. 5, 1969, Pat. No. 3,679,792, which is a continuation-in-part of Ser. No. 855,764, Sept. 5, 1969, Pat. No. 3,629,395, which is a continuation-in-part of Ser. No. 855,770, Sept. 5, 1969, Pat. No. 3,749,766, and Ser. No. 858,996, Sept. 18, 1969, Pat. No. 3,651,206, Continuation-in-part of Ser. No. 790,314, Jan. 10, 1969, abandoned. This application June 30, 1976, Ser. No. 701,189

Int. Cl.[2] A61K *7/16, 31/11*

U.S. Cl. 424—333 **40 Claims**

1. A confectionery food composition having anticaries activity comprising an effective amount of pyruvaldehyde to inhibit the acid production and growth of oral microorganisms and a food vehicle including a substantial amount of sugar.

4,053,639

THERAPEUTICALLY ACTIVE PHENYLALKANE DERIVATIVES

Stewart Sanders Adams; Bernard John Armitage; John Stuart Nicholson, all of Nottingham, England, and Antonio Ribera Blancafort, Madrid, Spain, assignors to The Boots Company Limited, Nottingham, England

Continuation-in-part of Ser. No. 308,558, Nov. 12, 1972, Pat. No. 3,793,457, which is a division of Ser. No. 845,033, July 25, 1969, Pat. No. 3,755,427, which is a continuation-in-part of Ser. No. 425,624, Jan. 14, 1965, abandoned. This application Oct. 4, 1973, Ser. No. 391,759

Int. Cl.[2] C07C *31/34;* **A01N** *9/24;* **A61K** *31/045*

U.S. Cl. 424—343 **8 Claims**

1. A compound selected from the group consisting of
2-(2-fluoro-4-biphenylyl)propan-1-ol,
2-(2'-fluoro-4-biphenylyl)propan-1-ol and
2-(2,2'-difluoro-4-biphenylyl)propan-1-ol

4,053,640

FISHING BAIT AND METHOD OF MAKING SAME

Tadashi Takasugi, No. 30-18 Kita Shinjuku 1-chome, Shinjuku, Tokyo, Japan

Filed June 30, 1975, Ser. No. 582,397

Claims priority, application Japan, May 26, 1975, 50-066002

Int. Cl.[2] A23L *1/325*

U.S. Cl. 426—1 **4 Claims**

1. A fishing bait for attracting fish, said bait being made by (a) pulverizing raw bait to a micronized bait form, (b) mixing the micronized bait of (a) with an anionic surface active agent derived from fish oil in an amount necessary to promote dispersing said micronized bait in water, (c) vacuum freeze drying said micronized bait, and (d) again pulverizing the dried bait from (c) to micronized form.

4,053,641

METHOD OF MAKING YEAST FOOD PRODUCTS

Homer R. Elling, Seattle, Wash., assignor to Homer R. Elling, Seattle, Wash.

Filed Oct. 23, 1975, Ser. No. 625,027

Int. Cl.[2] A21D *8/02*

U.S. Cl. 426—19 **5 Claims**

1. A quick method of making yeast-raised bread products which eliminates sticky doughs and the requirements of kneading and multiple yeast fermentation periods,, comprising:
preparing a yeast containing underdeveloped flour dough without the addition of any fat,
incorporating fat uniformly throughout the dough and developing the gluten of the dough by
a. placing the dough between a flexible sheet material whose surfaces contacting the dough have been previously coated with a liquid fat,
b. flattening the dough between the sheets of flexible material, and in contact with the surfaces of the sheet material coated with the liquid fat,
c. removing the flexible sheet to expose the flattened dough,
d. folding the dough on itself,
e. repeating steps (b), (c) and (d) to develop the gluten of the flour and until the dough has a uniform color, indicating proper development thereof,
allowing the dough to rise, and
baking the dough.

4,053,642

STARTER CULTURE PRODUCTION

Gerhard Hup, Ede, and Jacobus Josephus Stadhouders, Bennekom, both of Netherlands, assignors to Stichting Bedrijven Van Het Nederlands Instituut voor Zuivelonderzoek, Ede, Netherlands

Continuation-in-part of Ser. No. 356,179, May 1, 1973, abandoned. This application June 12, 1975, Ser. No. 586,363
Claims priority, application Netherlands, May 2, 1972, 7205909
Int. Cl.[2] A23C *9/12, 19/02, 21/00*
U.S. Cl. 426—36 14 Claims

1. A method of producing a composition for use as an inoculant material in the preparation of starters and fermented milk products, comprising (a) cultivating a culture of at least one strain of milk sugar fermenting bacteria in a culture medium consisting essentially of (1) undemineralized whey, (2) an aqueous dispersion of added non-whey protein selected from the group consisting of soya protein and milk casein in such an amount that the culture medium contains about 0.1 to 0.5 weight percent non-whey protein, and (3) a buffer mixture, said culture medium being prepared by separately pasteurizing said whey, said aqueous dispersion of non-whey protein and said buffer and mixing together the resultant pasteurized whey, aqueous dispersion of non-whey protein and buffer, (b) centrifuging the culture medium after said cultivating to concentrate more than 90% of the bacteria into a volume of about 2% of that of the culture medium prior to centrifuging and (c) freeze drying the bacteria concentrate to produce a composition which can be added directly to milk.

4,053,643

PROCESS FOR INCREASING CHEESE CURD YIELD

Edgar A. Corbin, Jr., Manchester, Mo., assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Aug. 4, 1976, Ser. No. 711,606
Int. Cl.[2] A23C *19/02*
U.S. Cl. 426—40 11 Claims

1. An acid cheese curd making process consisting essentially of

A. adding a condensed phosphate salt in sufficient amount to increase cheese curd yield to milk before or after acidification, the pH after acidification being from about 4.95 to about 5.3 and the temperature before and after acidification being from about 5° C to about 40° C to obtain an acidified milk and condensed phosphate salt mixture; then

B. maintaining the milk and salt mixture at about 26° C to about 40° C, with the proviso that if the milk and salt mixture is below 26° C, the mixture is heated to about 26° C to about 40° C, thereafter

C. adding to the acidified milk and salt mixture to about 26° C to about 40° C from about 0.01 to about 0.05 parts by weight of proteolytic enzyme and, optionally, an acidogen in an amount up to about 0.5 parts by weight per 100 parts by weight of the acidified milk and salt mixture; and thereafter

D. allowing the acidified milk and salt mixture to remain quiescent at a temperature of from about 26° C to about 40° C for from about 45 minutes to about 2 hours to form an acid cheese curd suitable for making cottage cheese, bakers' cheese, quark cheese, cream cheese and Neufchatel cheese.

4,053,644

PROCESS OF REMOVING THE COOKED FLAVOR FROM MILK

Harold E. Swaisgood, Raleigh, N.C., assignor to Research Triangle Institute, Research Triangle Park, N.C.

Filed Oct. 10, 1975, Ser. No. 621,631
Int. Cl.[2] A23C *3/02, 9/12;* C07G *7/02*
U.S. Cl. 426—42 4 Claims

1. A process of treating fluid milk having a cooked flavor which has been heated in excess of 155° F for a period of time sufficient to procduce a cooked flavor which comprises substantially removing the cooked flavor from said fluid milk by contacting said fluid milk having a cooked flavor with immobilized sulfhydryl oxidase enzyme.

4,053,645

PROCESS OF INCREASING THE DIGESTABILITY OF CELLULOSIC MATERIAL USING NITRIC ACID

James W. Jelks, Route 1, Box 461, Sand Springs, Okla. 74063

Filed Feb. 2, 1976, Ser. No. 654,555
Int. Cl.[2] A23K *1/00*
U.S. Cl. 426—53 15 Claims

1. A process of treating cellulosic plant material to increase the digestability thereof by animals comprising:

chopping the cellulosic plant material into particles;

mixing the chopped cellulose material with water to thoroughly wet the same;

mixing nitric acid with the wet cellulosic material to reduce the pH of the mixture to 0.5 to 3.5; and

cooking the mixture at about 100 to 125 psig steam pressure for about 30 to 60 minutes to break lignin cellulose bonds and to convert at least a portion of the cellulose for use as a digestible material suitable as animal feed.

4,053,646

WATER STABLE STARCH-LIPID COMPOSITION AND METHOD FOR PREPARING SAME

Walton Reid Wright, and Albert E. Purcell, both of Raleigh, N.C., assignors to Walton Reid Wright, Raleigh, N.C.

Continuation-in-part of Ser. No. 262,735, June 14, 1972, abandoned. This application May 8, 1975, Ser. No. 575,603
Int. Cl.[2] A23K *1/00*
U.S. Cl. 426—62 22 Claims

1. A composition in solid state comprising the water-insoluble solids portion of vegetable starch and lipid-containing material from the class consisting of vegetable and animal oils and fats suitable for use in an animal food composition characterized by immobility of the lipid in water.

4,053,647

PET FOOD PRODUCT AND PROCESS OF PRODUCING SUCH

Samuel Prussin, General Delivery, Carmel, Calif. 93921

Filed Dec. 12, 1975, Ser. No. 640,163
Int. Cl.[2] A23K *1/18, 1/16*
U.S. Cl. 426—92 11 Claims

1. A process of producing a gustatory response inducing product which comprises comminuting an effective proportion of a proteinaceous substrate; forming an aqueous mass containing said comminuted substrate; cooking said aqueous mass under mild cooking conditions of about 220° F to 300° F, but insufficient to substantially liquify and substantially hydrolyze said proteinaceous substrate, thereby resulting in an aqueous mass having cooked, solid proteinaceous particles of a size sufficient to enable settling thereof; homogenizing said cooked aqueous mass to further comminute said protein particles and to form a substantially colloidal suspension of said cooked, solid proteinaceous material; adjusting the solids content thereon to about 1 to 20 weight percent; and admixing said colloidal suspension with an aerosol propellant in a container suitable for spraying.

4,053,648
BOTTLE FOR STERILE DISPENSING OF FLOWABLE CONTENTS

Manfred Carl Schmid, Anspacher Strasse 39, and Rolf Richard Wilhelm Reiss, Obernhainer Weg 8, both of Bad Homburg, Germany

Filed Nov. 20, 1974, Ser. No. 525,441
Int. Cl.[2] A61J *11/00, 15/00*
U.S. Cl. 426—117 21 Claims

1. The combination of a bottle closure device having an interior chamber and an internally threaded lower neck, dispensing means carried on and extending through an opening in the upper end of said closure device and in dispensing communication with said interior chamber, closure means mounted in sealed engagement to the upper end of said closure device and covering said dispensing means; a bottle containing flowable contents having a bottle top with complementary external threads along a portion of its length and received within the lower end of said closure device for the sterile storage and dispensing of said flowable contents and having a continuous unbroken integrally formed top wall on said bottle top effective to maintain sterile conditions in said bottle; cutting means mounted in the interior chamber of and carried by said closure device in axial proximity to said top wall such that the cutting means can be displaced into cutting engagement with said top wall by axial advance of said closure device in its threaded engagement on said bottle top; screen means carried within said interior chamber of said device to retain any chips produced by said cutting means from being dispensed through said dispensing means; and a pair of closely spaced annular beads with a fillet therebetween on said bottle top axially spaced from said external threads and received within said closure device and a cooperative annular bead on said neck of said closure device axially spaced form the internal threads thereon, said cooperative annular bead received within said fillet to provide restraining and microbiological sealing means, yieldably restraining said axial displacement of said device on said bottle top to prevent inadvertent rotation of and axial displacement of closure device and displacement of said cutting means toward said top wall, and microbiologically sealing said interior chamber to the environment.

4,053,649
PREPARATION OF SLICED DRIED BEEF PRODUCT

Joseph T. Svacik, Phoenix, Ariz., assignor to Armour and Company, Phoenix, Ariz.

Continuation-in-part of Ser. No. 360,049, March 29, 1973, Pat. No. 3,914,444. This application Aug. 7, 1975, Ser. No. 602,812
The portion of the term of this patent subsequent to Oct. 21, 1992, has been disclaimed.
Int. Cl.[2] A22C *11/02*
U.S. Cl. 426—266 4 Claims

1. In a process for preparing a dried beef product including stuffing pieces of beef which has been frozen and thawed along with curing ingredients into a preformed fibrous casing, curing said beef in said casing, subjecting the cured beef to a drying procedure to remove moisture therefrom, and chilling and slicing the dried beef, the improvement comprising conducting said drying procedure by immersing said casing containing the cured beef in a solution of common salt having a concentration of from 8 to 26 percent at a temperature of from 120° to 190° F for a period of time sufficient to remove a substantial amount of moisture from the meat.

4,053,650
BAKED CONFECTIONS AND PROCESS FOR THE PREPARATION THEREOF

Jiro Chino, and Kazuhiko Nakada, both of Yokohama, Japan, assignors to Meji Seika Kaisha Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 523,494, Nov. 13, 1974, abandoned. This application Apr. 28, 1976, Ser. No. 681,042
Claims priority, application Japan, Nov. 13, 1973, 48-126806
Int. Cl.[2] A21D *2/00, 10/00, 8/00*
U.S. Cl. 426—304 3 Claims

1. A process for the preparation of mold-baked confections, comprising the steps of:

coating edible particles alternately with an aqueous viscous solution selected from the group consisting of a corn syrup, a sugar solution, a gum solution and a dextrin solution and mixtures thereof, and a leavening agent selected from the group consisting of ammonium carbonate and sodiumbicarbonate, and with an edible flour composition comprising more than 40% of self-nonexpandable cereal flour or starches selected from the group consisting of wheat flour, rice flour, maize starch and potato starch and less than 60% of selfexpandable cereal flours or starches selected from the group consisting of α-waxy rice flour and α-waxy maize starch, in a rotating coating device, said coating operation being repeated until the coated particles reach about 60 to 90% of the size of the inner cavity of a baking mold, the moisture of the coated layer of said coated particles being in an amount of about 15 to 22% by weight of the coated layer;

placing said coated particles in the baking mold consisting of upper and lower matching units and having a cavity of a desired shape; and

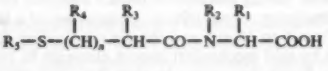
after joining together said upper and lower parts of said baking mold, baking said coated particles in said mold at a temperature in the range of from 150° C to 200° C for a period of time sufficient to cause the coated compositions of said coated particles to expand so that the cavity of said baking mold is filled with the expanding materials.

4,053,651
COMPOUNDS AND METHOD FOR ALLEVIATING ANGIOTENSIN RELATED HYPERTENSION

Miguel Angel Ondetti, Princeton, and David W. Cushman, West Windsor, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 10, 1976, Ser. No. 684,606
Int. Cl.[2] A61K *31/40, 31/195, 31/415*
U.S. Cl. 424—319 11 Claims

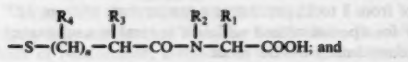
1. A method for alleviating angiotensin related hypertension in hypertensive mammals which comprises administering an effective dose of an angiotensin converting enzyme inhibitor having the formula



or salt thereof, wherein

R_1 is hydrogen, lower alkyl, phenyllower alkylene, hydroxy-lower alkylene, hydroxyphenyl-lower alkylene or guanidinolower alkylene; R_2, R_3 and R_4 each is hydrogen, lower alkyl or phenyl-lower alkylene;

R_5 is hydrogen, lower alkanoyl, benzoyl or



n is 0, 1 or 2.

4,053,652

ROASTED AND GROUND COFFEE PRODUCT AND METHOD

James P. Mahlmann, Wayne, N.J., assignor to General Foods Corporation, White Plains, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,320
Int. Cl.[2] A23F *1/04*
U.S. Cl. 426—388 **8 Claims**

1. A method for producing a roasted and ground coffee product comprising the steps of:

a. separately roasting a first fraction of green coffee beans,

b. quenching the first roasted bean fraction to a moisture content of 0% to 4% by weight,

c. separately roasting a second coffee bean fraction,

d. quenching the second roasted bean fraction to a moisture content of 7% to 20% by weight, thereafter,

e. combining the fractions of steps b) and d) to obtain a roast coffee bean blend comprised of at least 10% by weight of each fraction, and

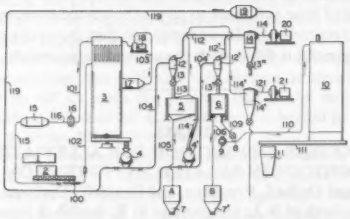
f. grinding said roast coffee bean blend, whereby a ground coffee product having a non-uniform particle size distribution is obtained, the average particle size of the first or low-moisture fraction being at least 300 microns smaller than that of the second or high-moisture fraction.

4,053,653

METHOD OF OBTAINING LUPULIN-RICH PRODUCTS FROM HOPS

Junjiro Miyata, and Yasushi Kikuchi, both of Fukushima, Japan, assignors to Asahi Breweries, Ltd., Tokyo, Japan

Filed Mar. 24, 1976, Ser. No. 669,872
Claims priority, application Japan, Mar. 4, 1976, 51-23509
Int. Cl.[2] C12C *3/00*; A23L *1/22*
U.S. Cl. 426—481 **8 Claims**



1. A method for obtaining a lupulin-rich product from hop cones, comprising the steps of: feeding hop cones into a first stream of cold air having a temperature of from −10° to −40° C and thereby freezing and conveying said hop cones into a storage tank; feeding cold air into the storage tank to complete the freezing of the hop cones therein; continuously feeding frozen hop cones at a controlled rate from the storage tank into a first crusher having mechanical impact elements therein and having a discharge screen whose openings are of a size in the range of from 6 to 15 mm and therein subdividing the frozen hop cones by said mechanical impact elements to reduce the size of the frozen hop cones so that they pass through said discharge screen; continuously flowing a second stream of cold air past said discharge screen to aspirate particles of said frozen hop cones from said first crusher into said second cold air stream and flowing said second stream containing said particles into a first cyclone and therein separating the cold air and dust from the particles; feeding the particles into a shaking sieve having a 60-mesh screen and therein separating the particles into a fine lupulin-rich fraction that passes through the 60-mesh screen and a coarse fraction and recovering the fine fraction as a first lupulin-rich product; feeding the coarse fraction into a second crusher having mechanical impact elements therein and having a discharge screen whose openings are of a size in the range of from 3 to 6 mm and are from 2 to 10 mm smaller than the openings in the discharge screen of said first crusher and therein subdividing the particles of the coarse fraction by said mechanical impact elements to reduce the size thereof so that they pass through said discharge screen of the second crusher; continuously flowing a third stream of cold air past said discharge screen of said second crusher to aspirate subdivided particles of said coarse fraction from said second crusher into said third stream and flowing said third stream containing said subdivided particles into a second cyclone and therein separating the cold air and dust from the subdivided particles; feeding the subdivided particles into a second shaking sieve having a 60-mesh screen and therein separating the subdivided particles into a second fine lupulin-rich fraction that passes through the 60-mesh screen and a second coarse fraction and recovering said second fine fraction as a second lupulin-rich product; the foregoing steps of the method being carried out so as to maintain the hop cones and particles thereof in a frozen condition throughout and with the cold air streams being air locked so as to prevent ingress of ambient air thereinto.

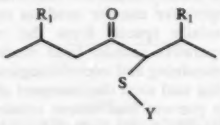
4,053,654

USES OF α-OXY(OXO) SULFIDES AND ETHERS IN FOODSTUFFS AND FLAVORS FOR FOODSTUFFS

William J. Evers, Red Bank; Howard H. Heinsohn, Jr., Hazlet, and Manfred Hugo Vock, Locust, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 730,537, Oct. 7, 1976. This application Feb. 4, 1977, Ser. No. 765,633
Int. Cl.[2] A23L *1/226, 1/235*
U.S. Cl. 426—535 **4 Claims**

1. A process for augmenting or enhancing the taste or aroma of a foodstuff comprising the step of adding to said foodstuff from about 0.1 ppm up to about 50 ppm by weight of said foodstuff of an alpha oxosulfide compound having the structure:



wherein R_1 is hydrogen or methyl and Y is methoxycarbonylmethyl.

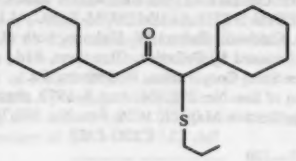
4,053,655

USES OF α-OXY(OXO) SULFIDES AND ETHERS IN FOODSTUFFS AND FLAVORS FOR FOODSTUFFS

William J. Evers, Red Bank; Howard H. Heinsohn, Jr., Hazlet, and Manfred Hugo Vock, Locust, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 730,537, Oct. 7, 1976. This application Feb. 4, 1977, Ser. No. 765,865
Int. Cl.[2] A23L *1/226, 1/235*
U.S. Cl. 426—535 **2 Claims**

1. A process for augmenting or enhancing the taste or aroma of a foodstuff comprising the step of adding to said foodstuff from about 0.1 ppm up to about 50 ppm by weight of said foodstuff of an alpha oxosulfide compound having the structure:



4,053,656

FOODSTUFF FLAVORED WITH NEW MERCAPTO ALCOHOLS AND MERCAPTOALKYL ESTERS

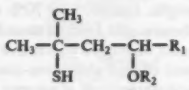
Jan Stoffelsma, Hoevelaken, and Jacob Pypker, Bilthoven, both of Netherlands, assignors to Polak's Frutal Works B.V. and Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V., both of Amersfoort, Netherlands

Division of Ser. No. 347,624, April 4, 1973, Pat. No. 3,970,689. This application May 6, 1976, Ser. No. 683,753

Int. Cl.[2] A23L *1/226, 1/234, 1/235*

U.S. Cl. 426—535 **3 Claims**

1. A foodstuff which has added thereto about 10^{-12} to 10^{-2} gram per gram of a compound having the formula



where R_1 is hydrogen or methyl and R_2 is hydrogen, formul, or acetyl, to develop or fortify a fruity, green, burnt, roasted, or smoked flavor note.

4,053,657

FOODS AND FLAVOR USE OF 1-(3,3-DIMETHYL-2-NORBORNYL-2-PROPANONE

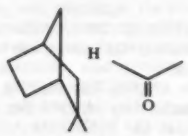
William L. Schreiber, Jackson; James N. Siano, Keyport; Manfred Hugo Vock, Locust, all of N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Dec. 3, 1976, Ser. No. 747,308

Int. Cl.[2] A23L *1/226*

U.S. Cl. 426—538 **2 Claims**

1. A process for augmenting or enhancing the flavor of a foodstuff comprising the steps of adding to a foodstuff from 0.5 parts per million up to about 100 parts per million of compound having the structure



wherein the wavy lines are representative of exo or endo configurations.

4,053,658

METHOD FOR TREATING MUSHROOMS

Verne E. Wilken, 601 S. Dixie Highway, Lot 38, Stuart, Fla. 33494

Filed Dec. 9, 1976, Ser. No. 748,900

Int. Cl.[2] A23L *1/212*

U.S. Cl. 426—615 **8 Claims**

1. A method for cleaning and preserving mushrooms and improving the flavor thereof, which comprises:

a. soaking at least one mushroom in an edible vegetable oil for a time period sufficient for the oil to be absorbed into the tissues of the mushroom;

b. subjecting the mushroom to a water rinse step to remove accumulations of soil and the vegetable oil on the surface of the mushroom; and

c. allowing the mushroom to dry.

4,053,659

ADHERENT POWDER COATINGS ON A BASIS OF PVC COPOLYMERS

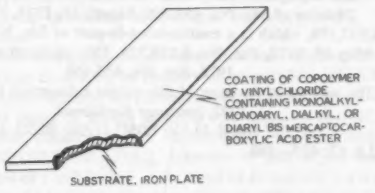
Peter Gebauer, and Peter Unrath, both of Trotsdorf, Germany, assignors to Dynamit Nobel Aktiengesellschaft, Cologne, Germany

Filed Feb. 12, 1974, Ser. No. 441,787

Claims priority, application Germany, Feb. 17, 1973, 2308202

Int. Cl.[2] B05D *3/02, 1/24*

U.S. Cl. 427—27 **25 Claims**


COATING OF COPOLYMER OF VINYL CHLORIDE CONTAINING MONOALKYL-MONOARYL-, DIALKYL-, OR DIARYL BIS MERCAPTOCARBOXYLIC ACID ESTER
SUBSTRATE, IRON PLATE

1. Process of producing an article coated with a vinyl chloride polymer which comprises depositing a powder directly on the surface of a substrate which is a body portion of the article, and which is free of adhesivizing agent and forming a coating film of the surface of the substrate by melting the powder thereon, and hardening the film to form said coated article, said powder being a composition comprising a copolymer of vinyl chloride admixed with monoalkylmonaryl, dialkyl, or diaryl tin bismercaptocarboxylic acid ester of polyvalent alcohol in an amount sufficient to improve adhesion of the copolymer to the substrate and provide a self-adherent coating, said composition being free of plasticizer.

4,053,660

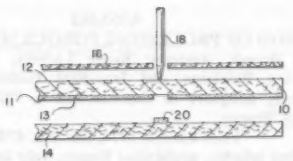
LOW COST TRANSFER INK COATING

Harold S. Hurwitz, Downers Grove, and Harold E. Dyas, Hillside, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Dec. 10, 1975, Ser. No. 639,524

Int. Cl.[2] B41M *5/10*

U.S. Cl. 427—153 **2 Claims**



1. A process for producing a transfer sheet having a transferable coating on said transfer sheet, said transfer sheet for use in producing master sheets by localized, patterned pressure against said transfer sheet, from which master sheets multiple copies may be made by pressure against the surface thereof, said process comprising:

agitating a mixture of polyhydroxy alcohol, a non-drying oil, and a wax;

heating to and maintaining said agitating mixture at approxi-

mately 180°, whereby said agitating mixture is rendered completely in the liquid state;
adding a kaolinite clay to said agitating mixture;
maintaining agitation thereof for at least approximately 15 minutes;
slowly sifting a dye soluble therein into said agitating mixture;
further agitating said mixture until said soluble dye has completely dissolved in said mixture;
grinding said mixture to a particle diameter size of between approximately 0.0002 and 0.0004 inches; and
coating said mixture on said transfer sheet surface.

4,053,661

PARTICLE CLOUD COATING METHOD AND APPARATUS

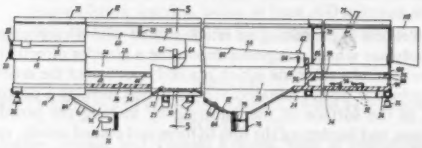
William C. Goodridge, Branford, Conn., assignor to Electrostatic Equipment Corporation, New Haven, Conn.

Division of Ser. No. 454,566, March 25, 1974, Pat. No. 3,937,179, which is a continuation-in-part of Ser. No. 254,472, May 18, 1972, Pat. No. 3,828,729. This application Jan. 29, 1976, Ser. No. 653,468

The portion of the term of this patent subsequent to Oct. 21, 1992, has been disclaimed.

Int. Cl.² B05B *15/04;* B05C *11/06;* B05D *1/24*

U.S. Cl. 427—185 **5 Claims**



1. In a method for coating an object, the steps comprising: generating a cloud of particles adjacent one side of a generally upstanding baffle having an elongated edge portion permitting ready passage thereacross of said particles from said cloud, and passing at least an axial portion of an object to be coated laterally adjacent the other side of said baffle along a predetermined travel path which traverses the imaginary, laterally-extending projection surface of said edge portion at a non-perpendicular angle thereto, said baffle initially blocking from contact by said particles at least said axial portion of the object, and causing exposure of progressively lower vertical portions thereof for contact by said particles during passage of the object along said travel path thereby, so as to develop a coating on said axial portion along an axis that is angularly displaced from the axis of said travel path.

4,053,662

METHOD OF PROCESSING POROUS METAL FILTERS

Pierre Bergez, Asnieres; Roger Lacroix, Suresnes; Pierre Plurien, Palaiseau, and Jean-Paul Touboul, Paris, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed June 7, 1974, Ser. No. 478,744

Claims priority, application France, July 26, 1973, 73.27357

Int. Cl.² C23C *13/02, 13/04*

U.S. Cl. 427—250 **7 Claims**

1. A method of processing porous metal filters used for separating isotopes of uranium hexafluoride, so as to improve the mechanical strength and resistance to corrosion of the filters, characterized in that the filters are placed in the presence of an aluminum-based cement in a closed heat-resistant and oxidation-resistant vessel, the interior of the vessel is disposed in an inert gas atmosphere and the vessel is heated to between 800° and 1000° C in a furnace for about 1 hour.

4,053,663

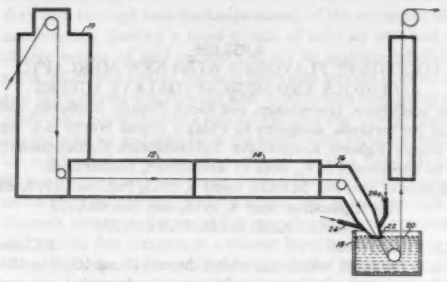
METHOD OF TREATING FERROUS STRAND FOR COATING WITH ALUMINUM-ZINC ALLOYS

Laurence B. Caldwell; Robert W. Helman, both of Bethlehem, Pa., and Leonard P. Pellatiro, Glen Arm, Md., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Continuation of Ser. No. 278,304, Aug. 9, 1972, abandoned. This application May 27, 1976, Ser. No. 690,749

Int. Cl.² C23C *1/02*

U.S. Cl. 427—320 **8 Claims**



1. A method of coating a ferrous strand with an alloy coating comprising, by weight, about 25 to 70% aluminum, balance essentially zinc, wherein said ferrous strand is caused to move from a heating furnace through a protective hood into a molten metal bath composed of said aluminum-zinc alloy, into which said protective hood extends in a manner to enclose a small portion of the surface of said molten metal bath within said protective hood, comprising the steps of:

a. introducing into said protective hood a reducing gas preheated to a temperature of at least about 750° F. and composed of at least 20% by volume of hydrogen, balance essentially nitrogen, said reducing gas having a dew point no greater than about 0° F. and being introduced in such a manner as to sweep across the surface of the molten metal bath,

b. correlating the hydrogen content of said reducing gas with the dew point thereof so as to control bath surface oxidation within said protective hood to avoid bath oxide particle pickup on the strand, and

c. continuing to introduce such correlated preheated reducing gas into said protective hood and causing said reducing gas to flow countercurrent to the movement of the ferrous strand, whereby to bathe and maintain said strand within said protective hood and heating furnace under reducing conditions.

4,053,664

LOW TEMPERATURE GLAZING METHOD

Douglas W. Dill, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Division of Ser. No. 491,589, July 24, 1974, Pat. No. 3,983,060. This application July 14, 1976, Ser. No. 705,203

Int. Cl.² B05D *1/38, 3/02*

U.S. Cl. 427—379 **10 Claims**

1. A method for coating ceramic articles comprising:

a. Priming the surface of said article with a coating of an aqueous dispersion of a first acrylic resin having a monomer composition of 40–85% by weight methyl methacrylate, 45–15% by weight butyl acrylate and 0–15% by weight of methacrylic acid, said dispersion having 15–25% non-volatiles and a pH of 8.5–10.5;

b. Coating said primed surface with at least 1 coating of a mixture of 25–75% by weight of an aqueous dispersion of a second acrylic resin having a monomer composition of 40–85% by weight methyl methacrylate, 45–15% by weight butyl acrylate and 0–15% by weight of methacrylic acid, said dispersion having 15–25% non-volatiles and a pH of 8.5–10.5, and 75–25% by weight of a pow-

dered resin composition having a particle size of about 100 to about 400 mesh consisting essentially of 96–80% by weight of a third acrylic resin having a monomer composition of 60–85% methyl methacrylate and 40–15% by weight butyl acrylate having a weight average molecular weight of 10,000–20,000 and a Tg of greater than 45° C and 4–20% by weight of a pigment; and

c. Baking said coated article for 30 minutes to 4 hours at a temperature of 275°–450° F.

4,053,665

MOLDED PLASTIC BEARING ASSEMBLY

Stanley S. Orkin, Rockville, and Edward John Nagy, Windsor, both of Conn., assignors to Kamatics Corporation, Bloomfield, Conn.

Division of Ser. No. 601,956, Aug. 4, 1975, which is a division of Ser. No. 452,359, March 18, 1974, Pat. No. 3,929,396, which is a continuation-in-part of Ser. No. 241,007, April 4, 1972, Pat. No. 3,806,216. This application Apr. 27, 1976, Ser. No. 680,879

The portion of the term of this patent subsequent to Apr. 23, 1991, has been disclaimed.

Int. Cl.[2] B05D *3/02;* **F16C** *33/12*

U.S. Cl. 427—385 C **3 Claims**

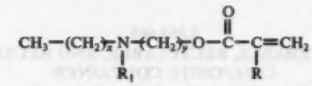
2. A method of producing a molded bearing assembly comprising two coengaging members movable relative to one another, the first of said members having a bearing surface selected from the group consisting of metal and ceramic and the bearing surface of said other member comprising a molded mixture of an acrylate composition and particulate solid lubricant, the bearing surface of said first member being coated with a thin film of a parting agent to prevent adhesion thereof to said molded bearing surface, the steps comprising coating said first bearing member with a thin film of a parting agent, applying a curable mixture of said acrylate composition and particulate solid lubricant to the parting agent coated first bearing member and curing said mixture in the absence of an oxygen-containing gas at a temperature ranging from ambient temperature to 325° F, thereby producing said other member and said molded bearing assembly, said acrylate composition being selected from the group consisting of:

a. a mixture of a major amount of liquid acrylic ester selected from the group consisting of di-, tri- and tetraesters of an acrylic acid and a polyhydric alcohol, a minor amount of a low molecular weight prepolymer of an ester of a low molecular weight alcohol having a terminal vinyl group and an aromatic polycarboxylic acid in solution in said acrylic ester and an organic amide of the formula

wherein R is selected from the group consisting of hydrogen and aliphatic hydrocarbon of 1–20 carbon atoms in an amount sufficient to copolymerize said acrylic ester and prepolymer,

b. a mixture of acrylic ester monomer, a peroxidic initiator in an amount sufficient to initiate polymerization of said monomer and an aminoalkoxyalkylamine of the formula $R_1—N(H)R_2[OR_3]_xN(H)R_4$ wherein x is an integer of 1–6 inclusive, each of R_1 and R_4 is selected from the group consisting of hydrogen and lower alkyl each of R_2 and R_3 is a lower alkyl linking bridge between N and O, in an amount sufficient to accelerate the polymerization of said monomer,

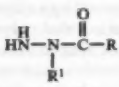
c. a mixture of an acrylic ester of an alkyl amino alcohol and an effective amount of a hydroperoxide catlyst, said acrylic ester having the formula



wherein x is an integer of 0–5 inclusive, y is an integer of 1–6 inclusive, R is selected from the group consisting of hydrogen, halogen, hydroxy, cyano and lower alkyl and R_1 is selected from the group consisting of hydrogen and alkyl having 1–6 carbon atoms,

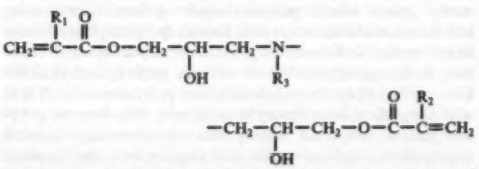
d. a mixture of a liquid acrylic ester monomer selected from the group consisting of diesters of an acrylic acid and a polyhydric alcohol, acrylic esters of cyclic ether alcohols, acrylic esters of amino alcohols and mixtures thereof, a peroxidic initiator and an oxyalkylamine of the formula $(H)_mN[(CH_2)_x(OR_1)_yOR_2]_n$ wherein m and n are each integers of 1 to 2 inclusive, the total of m and n is 3, x is an integer of 1 to 6 inclusive, y is an integer of 0 to 6 inclusive, R_1 is lower alkyl and R_2 is hydrogen or lower alkyl;

e. a mixture of an acrylic ester monomer selected from the group consisting of di-, tri- and tetraesters of an acrylic acid and a polyhydric alcohol, acrylic esters of cyclic ether alcohols, acrylic esters of amino alcohols and mixture thereof, a peroxidic initiator of an amount sufficient to initiate polymerization of said monomer and a member selected from the group consisting of rhodanine and a hydrazide of the formula



wherein R and R^1 are selected from separate groups and an interconnected group forming a cyclic ring, R is further selected from the group consisting of hydrogen, alkyl, cycloalkyl, aryl and alkoxy and R^1 is selected from the group consisting of hydrogen, alkyl, cycloalkyl, acyl and dithiocarbonyl in an amount sufficient to accelerate the polymerization of said monomer; and

f. a mixture of a monomer of the formula



wherein R_1 and R_2 are selected from the group consisting of hydrogen and lower alkyl and R_3 is selected from the group consisting of lower alkyl, lower hydroxyalkyl, cyano and lower cyanoalkyl; at least one equivalent of an acid for each equivalent of said monomer, said acid being selected from the group consisting of acrylic acid and lower alkyl acrylic acids; an initiator selected from the group consisting of t-butyl perbenzoate, t-butyl peracetate and di-t-butyl diperphthalate, said initiator being present in an amount sufficient to initiate the polymerization of said monomer; a trihydroxy benzene inhibi-

tor and an accelerator selected from the group consisting of benzhyrazide and N-aminorhodanine.

4,053,666

RECOVERABLE, RECYCLABLE, AND REUSABLE COMPOSITE CONTAINER

Lynn J. Taylor, and Neal Troy, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 189,450, Oct. 14, 1971, abandoned. This application Jan. 16, 1975, Ser. No. 541,416
Int. Cl.[2] B65D *11/16;* B08B *7/04;* B05B *1/40*
U.S. Cl. 428—35 12 Claims

1. As an article of manufacture, a previously annealed glass container having at least a portion of its annealed, external surface coated with a protective, decorable film consisting essentially of a water removable, film-forming, thermoplastic organic polymer, said polymer being water soluble or dispersible and being selected from the group consisting of poly(ethylene oxide); poly(propylene oxide); ethylene oxide-propylene oxide copolymers; polyvinylpyrrolidinone; polyethyleneimine; poly(methyl vinyl ether); polyacrylamide; polymethacrylamide; poly(vinyl acetate); polyvinyl formal; poly(alkyl methacrylates); methyl cellulose; ethyl cellulose; hydroxyethyl cellulose; hydroxypropyl cellulose; sodium carboxymethyl cellulose; methyl hydroxypropyl cellulose; poly(acrylic acid) and salts thereof; poly(methacrylic acid) and salts thereof; ethylene-maleic anhydride copolymers; ethylene-vinyl alcohol copolymers, ethylene-acrylic acid copolymers; vinyl acetate-vinyl alcohol copolymers; methyl vinyl ether-maleic anhydride copolymers; and emulsifiable polyurethanes; said polymer being capable of removal by an aqueous medium such that the annealed glass container and polymer can be recovered, recycled, and reused, the film thickness being at least 0.002 inch and sufficient to provide scratch and shatter resistance for the container and to retain broken glass fragments upon fracture of the glass container so as to reduce the incidence of accidental injury.

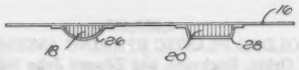
6. In a process for the preparation of a coated glass container, the improvement which comprises applying a film consisting essentially of a water removable thermoplastic organic polymer which is water soluble or dispersible and is selected from the group consisting of poly(ethylene oxide); poly(propylene oxide); ethylene oxide-propylene oxide copolymers; polyvinyl-pyrrolidinone; polyethyleneimine; poly(-methyl vinyl ether); polyacrylamide; polymethacrylamide; poly(vinyl acetate); polyvinyl formal; poly(alkyl methacrylates); methyl cellulose; ethyl cellulose; hydroxyethyl cellulose; hydroxypropyl cellulose; sodium carboxymethyl cellulose; methyl hydroxypropyl cellulose; poly(acrylic acid) and salts thereof; poly(methacrylic acid) and salts thereof; ethylene-maleic anhydride copolymers; ethylene-vinyl alcohol copolymers, ethylene-acrylic acid copolymers; vinyl acetate -vinyl alcohol copolymers; methyl vinyl ether-maleic anhydride copolymers; and emulsifiable polyurethanes; to at least a portion of the external surface of a previously annealed glass container, said film having a thickness of at least 0.002 inch and sufficient to provide scratch and shatter resistance for the container and to retain broken glass fragments upon fracture of the glass container so as to reduce the incidence of accidental injury, and being capable of removal by an aqueous medium such that the glass container and the coating film can be recovered, recycled, and reused.

4,053,667

STIFFENED STRUCTURAL LAMINATE AND METHOD OF MOLDING LAMINATE WITH STIFFENER BEADS

Bruce W. Smith, Nipomo, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Sept. 9, 1974, Ser. No. 504,441
Int. Cl.[2] B32B *3/12*
U.S. Cl. 428—36 6 Claims



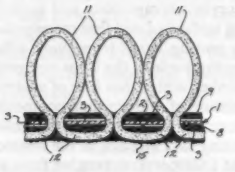
1. A rib-stiffened laminate formed by:
contacting a primary structure of at least one layer of a curable resin-impregnated fabric with at least one strip of cellular honeycomb core;
disposing another piece of said fabric over said strip of core in engagement with said core and said primary structure to define at least one reinforcing rib upon said primary structure; and
partially crushing said core and curing said resin under laminating conditions such that said core is bonded to said fabric and said fabric piece is bonded to said primary structure.

4,053,668

TUFTED CARPENTING WITH UNITARY NEEDLEBONDED BACKING AND METHOD OF MANUFACTURING THE SAME

Richard Kimmel, Lake Forest, and Robert C. Pickens, Jr., Wildwood, both of Ill., assignors to Brunswick Corporation, Skokie, Ill.

Continuation of Ser. No. 494,797, Aug. 5, 1974, abandoned. This application May 14, 1976, Ser. No. 686,479
Int. Cl.[2] B32B *33/00*
U.S. Cl. 428—95 4 Claims

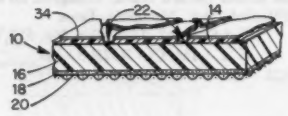


1. A ribbon scrim tufted carpet having a unitary backing with two staple faces that does the job of both a primary backing and secondary backing, the carpet comprising:
a. a unitary backing with two staple faces having:
1. a woven ribbon scrim with a first scrim side and a second scrim side, and
2. a deposit layer of staple fibers needled through the scrim to form a bottom fiber layer on one of the scrim sides and a subface fiber layer on the other scrim side, the bottom fiber layer being thicker than the subface fiber layer; and
b. yarn tufted through the unitary backing from the side having the bottom fiber layer to develop tufts, the tufts so developed:
1. being partially surrounded by fibers of bottom fiber layer to provide better tuft lock, and
2. extending above the subface fiber layer.

4,053,669
IMITATION SHEET MATERIAL WITH SURFACE GRAIN APPEARANCE

Vikram C. Kapasi, Chelmsford; Henry R. Lasman, Andover, both of Mass.; Robert J. Lebenson, Northampton, N.H., and Reuben Wisotzky, Lexington, Mass., assignors to Pandel-Bradford, Inc., Lowell, Mass.

Continuation of Ser. No. 460,127, April 11, 1974, abandoned. This application Apr. 22, 1976, Ser. No. 679,142
Int. Cl.[2] D06N 3/04
U.S. Cl. 428—151 11 Claims



1. A substitute leather sheet material characterized by an accentuated surface design effect thereon, which sheet material comprises:

a. a flexible, fibrous, base-supporting sheet material;

b. a continuous, flexible, first layer of a solid thermoplastic polymer characterized by a low modulus of elongation in psi at 100% elongation, the first layer secured to the base sheet material;

c. a discontinuous second layer of a solid thermoplastic polymer characterized by a high modulus of elongation in psi at 100% elongation of from about 2000 to 8000 psi, the second layer secured to the first layer, and forming raised areas of a surface design on the surface of the continuous layer;

d. the low and high-modulus polymers of the first and second layers having a difference of the modulus of elongation of at least 800 psi between the low and high-modulus polymers;

e. the second layer disposed in a predetermined manner over the entire surface of the first layer, and forming valley areas between the respective discontinuous second layer, which valley areas represent a pattern imitation of a predetermined design; and

f. the solid thermoplastic polymer of the first layer beneath the valley areas which form the surface pattern characterized by flexible, weak-hinge properties relative to the remaining portion of the solid first layer, said properties derived by repetitive flexing of the low-modulus polymer of the first layer in the areas beneath the valley areas to fracture and weaken the mechanical strength of the low-modulus polymer in such areas, thereby providing a material having an enhanced surface design effect thereon.

4,053,670
NON-WOVEN FABRICS

Roger LePoutre, Croix, France, assignor to Lantor International Limited, Bolton, England

Filed Oct. 31, 1975, Ser. No. 627,621
Int. Cl.[2] B31F 1/00
U.S. Cl. 428—156 14 Claims

1. A process for the manufacture of non-woven fabric which consists essentially of the following steps:

a. impregnating a web of non-woven fibres with a chemical binder capable of thermal polymerisation and with a curing agent for the binder,

b. coagulating but not drying the binder, to form a non-woven fabric,

c. coating one face of the fabric with a layer of a waterproofing agent,

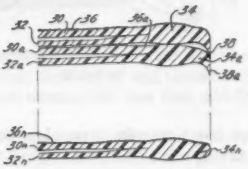
d. drying the impregnated and coated fabric and

e. heat embossing the non-coated face of the fabric.

4,053,671
ARTICLE HAVING EDGE-SEALED FILMS

Richard S. Carlisle, 1051 Broadway, Thornwood, N.Y. 10594

Division of Ser. No. 326,278, Jan. 24, 1973, Pat. No. 3,933,563, and a continuation-in-part of Ser. No. 231,288, March 2, 1972, Pat. No. 3,815,794, and Ser. No. 256,850, May 25, 1972, abandoned. This application Sept. 22, 1975, Ser. No. 615,816
The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.
Int. Cl.[2] B32B 3/02, 3/26, 7/04, 31/20, 31/26
U.S. Cl. 428—157 9 Claims



1. An article comprising a set or thermoplastic films confronting each other over at least the major area thereof and having a marginal seal of greater thickness than the initial thickness of said set of films and said seal extending from the confronting area of the films to and along a common edge that forms at least part of the outline of the article, said seal resulting from thermally fusing the material of said films together by heating a blade above the fusion temperature of the films and pressing the blade against a set of confronting thermoplastic films and thereby severing the films and forming a common sealed margin and heat-softening the films along the sealed margin across a markedly greater width than said greater thickness and fusing them together to form a seal of at least said greater thickness and enhancing the uniformity of the width of the seal by applying opposed pressure thereto while material of the films is at least partially molten and tacky so as to yield said marginal seal of said greater thickness and said greater thickness extending across the seal for a distance markedly greater than said greater thickness, the confronting films being disposed in essentially face-to-face contact adjacent the seal.

7. An article comprising a pair of laminated thermoplastic films, each film having a high-melting-temperature thermoplastic layer and a heat-sealable lower-melting-temperature thermoplastic layer, the lower-melting-temperature layers of the two films facing each other and the films confronting each other over at least the major area thereof and having a marginal seal of greater thickness than the initial thickness of said set of films and said seal extending from the confronting area of the films to and along a common edge that forms at least part of the outline of the article, said seal resulting from thermally fusing the material of said films together by heating a blade above the fusion temperature of the films and pressing the blade against a said pair of confronting thermoplastic films and thereby severing the films and forming a common sealed margin and heat-softening the films along the sealed margin across a markedly greater width than said greater thickness and fusing them together to form a seal of at least said greater thickness and enhancing the uniformity of the width of the seal by applying opposed pressure thereto while material of the films is at least partially molten and tacky so as to yield said marginal seal of said greater thickness and said greater thickness extending across the seal for a distance markedly greater than said greater thickness.

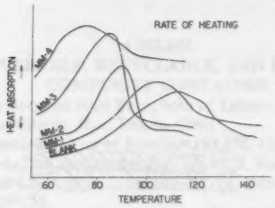
4,053,672

HOT STAMP TRANSFER PRESS PLATE

Ken Ando, Ikoma; Minoru Kamosaki, Ohimachi; Yoshinobu Ohya, Amagasaki, and Sigeru Asai, Ohimachi, all of Japan, assignors to Daicel, Ltd., Osaka, Japan

Filed Sept. 23, 1975, Ser. No. 616,112
Claims priority, application Japan, Sept. 24, 1974, 49-109786
Int. Cl.² B32B *3/00*
U.S. Cl. 423—207 **3 Claims**

CURVES SHOWING MELTING BEHAVIOR



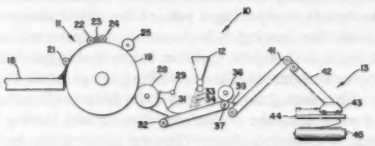
1. A hot stamp transfer press plate comprising a transfer substrate having a hot stamp ink applied thereon in a pattern, said hot stamp ink comprising a mixture of pigment and binder resin, said binder resin consisting essentially of a methoxymethylated nylon copolymer prepared by methoxymethylating an alcohol-soluble nylon copolymer of two or more members selected from the group consisting of nylon 6, nylon 11, nylon 12, nylon 66 and nylon 610, said nylon copolymer having a melting point of less than 150° C, said methoxymethylated nylon copolymer having a methoxymethylation ratio in the range of from 10 to 30%, wherein the methoxymethylation ratio is the ratio of nitrogen atoms bonded to methoxymethyl groups to the total number of nitrogen atoms contained in the methoxymethylated nylon copolymer.

4,053,673

GLOW-RESISTANT BATT AND PROCESS FOR PRODUCING SUCH

George Sumner Buck, Jr.; Robert George Weyker, both of Memphis, and Arthur Gerard Ward, Arlington, all of Tenn., assignors to Fiberlok, Inc., Memphis, Tenn.

Filed Sept. 12, 1975, Ser. No. 612,785
Int. Cl.² B32B *31/00*
U.S. Cl. 428—283 **10 Claims**



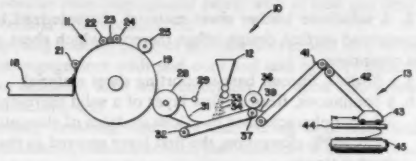
1. A process for producing a batt comprising the steps of:
I. forming a thin web fibers;
II. contacting the web with an adhesive amount of particles of a copolymer of vinyl chloride and vinylidene chloride;
III. contacting the web with an amount of diammonium phosphate
wherein the eight ratio of copolymer to diammonium phosphate is 100:4 to 100:40;
IV. forming the web into a batt
by laying the web transversely back and forth on a moving belt such that the batt comprises a plurality of webs; and then
V. heating the batt to a temperature above the sticking point of the copolymer but below the degradation point of the fibers
wherein the weight ratio of vinyl chloride to vinylidene chloride is 1:99 to 40:60 and
wherein the weight ratio of the copolymer to the fibers is 1:99 to 30:70 and
wherein the copolymer particles have a size range of from 1 to 200 microns.

4,053,674

GLOW-RESISTANT BATT AND PROCESS FOR PRODUCING SUCH

George Sumner Buck, Jr.; Robert George Weyker, both of Memphis, and Arthur Gerard Ward, Arlington, all of Tenn., assignors to Fiberlok, Inc., Memphis, Tenn.

Filed Sept. 12, 1975, Ser. No. 612,784
Int. Cl.² B32B *31/00*
U.S. Cl. 428—283 **10 Claims**



1. A process for producing a batt comprising the steps of:
I. forming a thin web of fibers;
II. contacting the web with an adhesive amount of particles of a copolymer of vinyl chloride and vinylidene chloride;
III. contacting the web with a glow-resistance imparting amount of boric acid;
IV. forming the web into a batt by laying the web transversely back and forth on a moving belt such that the batt comprises a plurality of webs; and
V. heating the batt to a temperature above the sticking point of the copolymer but below the degredation point of the fibers
wherein the weight ratio of vinyl chloride to vinylidene chloride is 1:99 to 40:60 and
wherein the weight ratio of the copolymer to the fibers is 1:99 to 30:70 and
wherein the copolymer particles have a size range of from 1 to 200 microns and
wherein the weight ratio of copolymer to boric acid is 5:10 to 200:10.

4,053,675

POLY(ARYLENE SULFIDE) COATED GLAZED SURFACE

Jennings P. Blackwell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 29, 1975, Ser. No. 581, 614
Int. Cl.² B32B *17/06*
U.S. Cl. 428—426 **125 Claims**

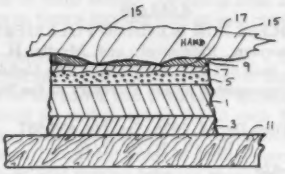
1. A coated article comprising:
a substrate having a glazed surface, and
a cured first coating adhered to said glazed surface, said first coating comprising poly(arylene sulfide) and an effective amount of a metal oxide suitable for improving adhesion of poly(arylene sulfide) to said glazed surface, said metal oxide having a particle size less than about 10^{-8} meters.

4,053,676

HANDLE GRIP MATERIAL

Bernard Kaminstein, Paramus, N.J., assignor to Litton Industries, Inc., Fitchburg, Mass.

Continuation-in-part of Ser. No. 597,392, July 18, 1975, abandoned. This application May 25, 1976, Ser. No. 689,830
Int. Cl.² B32B *3/26*
U.S. Cl. 428—310 7 Claims



7. A non-slip material comprising:
a. substrate,
b. a compressible coating on one surface of said substrate comprising a resinous binder having gas filled microspheres therein,
c. a wear resistant and tacky coating on said compressible coating comprising a carboxy-modified butadiene acrylonitrile copolymer,
d. a pressure sensitive adhesive coated on a surface of said substrate opposite the said on surface.

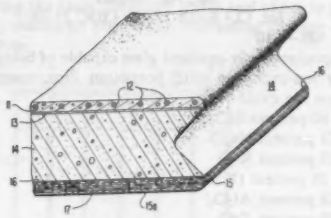
4,053,677

LIGHT CONCRETE MONOLITHIC SLAB

Manuel J. Corao, Apartado Postale 4940, Caracas, Venezuela

Filed Apr. 17, 1975, Ser. No. 569,333
Int. Cl.² B32B *3/26, 13/00*
U.S. Cl. 428—310 7 Claims

1. A building slab comprising:
a first layer of solid, lightweight, foamed concrete, said first layer having first and second surfaces;
a second layer of regular weight concrete coextensive with said first surface, disposed on said first surface, and having a thickness substantially less than said first layer;
metal reinforcing members embedded in said second layer;



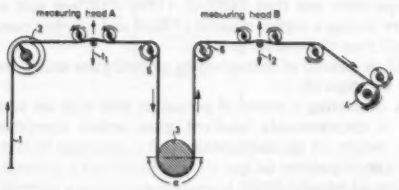
a third layer of regular weight concrete coextensive with said second surface, disposed on said second surface, and having a thickness substantially less than said first layer; and
an adhesive film composed of a mixture of granite, cement, and glass fibers interspersed between said first and second layers and between said first and third layers.

4,053,678

FIBER TOW FOR STUFFING PURPOSES AND PROCESS FOR PRODUCING IT

Helmut Betz; Geza Hidasi, both of Bobingen, and Hans-Otto Vom Orde, Augsburg, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 14, 1975, Ser. No. 623,303
Claims priority, application Germany, Oct. 17, 1974, 2449408
Int. Cl.² B32B *27/00;* D02G *3/00*
U.S. Cl. 428—369 2 Claims



1. A drawn, crimped and fixed fiber tow of synthetic high polymer fibers having an individual capillary titer of from 3 to 40 dtex, an ionic antistatic agent and 0.2 – 1% by weight of the fibers of the non-aqueous constituents of a conditioning agent consisting essentially of 0.1 – 0.4% by weight of a methyl hydrogeno polysiloxane having a viscosity of 25 – 35 cP at 20° C, 0.2 – 0.8% by weight of an alpha, omega-hydroxy dimethyl polysiloxane of a viscosity of 600 – 1,000 cP at 20° C, 0.02 – 0.1% by weight of an emulsifier for the polysiloxanes, 0.01 – 0.5% by weight of an Sn(II) salt of a fatty acid having 8 – 18 carbon atoms and 40 – 95% of high molecular weight polyethylene.

4,053,679

CHEMICALLY STRENGTHENED OPAL GLASS

Dale W. Rinehart, Natrona Heights, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 605,108, Aug. 15, 1975, Pat. No. 4,015,045, which is a continuation-in-part of Ser. No. 432,006, Jan. 9, 1974, abandoned. This application July 19, 1976, Ser. No. 706,661

Int. Cl.[2] B32B *17/00;* **C03C** *21/00*

U.S. Cl. 428—410 **16 Claims**

1. A spontaneously opalized glass capable of being strengthened by ion-exchange with potassium ions, comprising by weight on the oxide basis:

34 to 60 percent SiO_2
6 to 23 percent Na_2O
0 to 15 percent K_2O
18 to 26 percent ($Na_2O + K_2O$)
0 to 18 percent Al_2O_3
0 to 20 percent ZrO_2
4 to 21 percent ($Al_2O_3 + ZrO_2$)
7 to 20 percent P_2O_5
0 to 9 percent CaO
0 to 9 percent SrO
2 to 9 percent (CaO + SrO)
less than 0.1 percent Li_2O

said constituents comprising at least 90 percent by weight of the glass and proportioned relative to one another so as to provide the glass with a viscosity of 100 poises at a temperature less than 2800° F. (1538° C.).

4. A chemically strengthened, spontaneously opalized glass article exhibiting a surface compressive stress after being subjected to surface abrasion composed of an interior portion which is in tension and surface compressive layer, said interior portion comprised of by weight on the oxide basis:

34 to 60 percent SiO_2
6 to 23 percent Na_2O
0 to 15 percent K_2O
18 to 26 percent ($Na_2O + K_2O$)
0 to 18 percent Al_2O_3
0 to 20 percent ZrO_2
4 to 21 percent ($Al_2O_3 + ZrO_3$)
7 to 20 percent P_2O_5
0 to 9 percent CaO
0 to 9 percent SrO
2 to 9 percent (CaO + SrO)
less than 0.1 percent Li_2O

said constituents comprising at least 90 percent by weight of said interior portion and proportioned relative to one another so as to provide the glass with a viscosity of 100 poises at a temperature less than 2800° F. (1538° C.), and said surface layer having a higher content of K_2O and a lower content of Na_2O than the interior portion.

10. A method of strengthening an opal glass article comprising the steps of:

a. contacting a source of potassium ions with the surface of a spontaneously opalized glass article comprising by weight on the oxide basis:

34 to 60 percent SiO_2
6 to 23 percent Na_2O
0 to 15 percent K_2O
18 to 26 percent ($Na_2O + K_2O$)
0 to 18 percent Al_2O_3
0 to 20 percent ZrO_2
4 to 21 percent ($Al_2O_3 + ZrO_2$)
7 to 20 percent P_2O_5
0 to 9 percent CaO
0 to 9 percent SrO
2 to 9 percent (CaO + SrO)
less than 0.1 percent Li_2O

said constituents comprising at least 90 percent by weight of the glass article and proportioned relative to one another so as to provide the glass with a viscosity of 100 poises at a temperature less than 2800° F. (1538° C.);

b. heating said source of potassium ions while in contact with the glass to a temperature at which potassium ions from said source replace sodium ions in the glass, but essentially below the strain point of the glass, thereby creating a zone of compression at the surface of the glass which extends at least 5 microns into the glass; and

c. removing the glass from contact with the potassium ion source.

4,053,680

PROCESS FOR BONDING POLYMERS

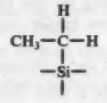
Bernard Wasserman, Ridgecrest, and Martin H. Kaufman, China Lake, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 4, 1975, Ser. No. 637,507

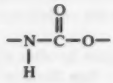
Int. Cl.[2] B32B *27/40*

U.S. Cl. 428—423 **2 Claims**

1. An article of manufacture comprising at least two layers, one of which is a silicon rubber layer and the second of which is a layer containing isocyanate cured hydroxy terminated polybutadiene, the layers being chemically tied together by chemical strings, the strings being chemically knotted in the silicone rubber layer by



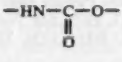
groups and in the isocyanate cured hydroxy terminated polybutadiene layer by



groups.

2. A method for chemically tieing a layer of silicone rubber to a layer of material containing isocyanate groups, said method comprising the steps of:

1. forming a mixture by mixing uncured silicone rubber prepolymer which contains silane groups with a material containing vinyl groups which are compatible with and reactive with the silane groups and hydroxy groups which are incompatible with the prepolymer and forming said mixture into a layer;
2. curing the prepolymer to form silicone rubber whereby the vinyl groups react with the silane groups and the hydroxy groups migrate to the surface of the layer;
3. applying a layer of the material which contains isocyanate groups to the surface of the silicone rubber; and
4. allowing isocyanate groups to react with the hydroxy groups whereby the layers become chemically tied together by chemical strings, the strings being chemically knotted in the silicone rubber layer by $CH_3-CH_2-Si\equiv$ groups and in the layer which contained isocyanate groups by



groups.

4,053,681

ADDITIVES FOR IMPROVED POLYESTER AND VINYL POLYMER COMPOSITIONS

Harold R. Edwards, Jr., Geneva, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Feb. 26, 1976, Ser. No. 661,485
Int. Cl.[2] B32B *17/10;* C08K *5/12;* C07C *69/76*
U.S. Cl. 428—431 11 Claims

1. A composition formed by reacting approximately equimolar amounts of (a) trimellitic acid or anhydride, (b) a dihydric alcohol containing from 2 to about 6 carbon atoms, and (c) an unsaturated acid or anhydride containing from 2 to about 6 carbon atoms and esterifying such reaction product with sufficient amounts of mono alcohol containing from 2 to about 18 carbon atoms to form a product with an acid number between about 0 and 30.

6. A composition prepared by (a) forming a first reaction product by reacting approximately equimolar amounts of trimellitic acid or anhydride and a dihydric alcohol containing from 2 to about six carbon atoms; (b) to such first reaction product adding sufficient amounts of monoalcohol containing from 2 to about 18 carbon atoms to form a second reaction product with an acid number between about 0 and 50; (c) to such second reaction product adding an approximately molar equivalent amount of an unsaturated acid or anhydride containing from 2 to about 6 carbon atoms; and (d) adding sufficient amounts of such monoalcohol to the resulting product to form a composition with an acid number between about 0 to 30.

4,053,682

PROCESS FOR IMPROVING THE ADHESION OF HOT MELTS TO METAL SUBSTRATES

Donald D. Donermeyer, Springfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed June 21, 1976, Ser. No. 698,241
Int. Cl.[2] B32B *15/08*
U.S. Cl. 428—460 16 Claims

1. A process for adhering a filled copoly(esteramide) to a metal substrate which comprises:

a. applying to the metal substrate a primer comprising an etherified methylolmelamine with a degree of methylolation in the range of about 5 to 6, a degree of etherification with a C_1 to C_6 alkanol or cycloalkanol in the range of about 3 to 6, and a degree of methylation of at least about 2 to provide a coating weight in the range of 1 to 166 g. per sq. meter;

b. heating the substrate to a temperature in the range of about 150° to about 300° C. to convert the etherified methylolmelamine from the liquid to the solid state; and

c. applying the filled copoly(ester-amide) as a hot melt to the formed surface at a temperature in the range of about 150° to 300° C.

4,053,683

SYSTEM FOR FUEL SUPPLEMENTATION

Charles E. Rounds, 109 S. Case, P.O. Box No. 6, Marion, Mich. 49665

Filed Mar. 4, 1976, Ser. No. 663,671
Int. Cl.[2] H01M *2/12;* F02M *7/00*
U.S. Cl. 429—8 3 Claims

1. An improved wet plate battery for use with an internal combustion engine carburetor and adapted to produce oxygen and hydrogen gas for enriching the air/fuel mixture inducted into the internal combustion engine, comprising:

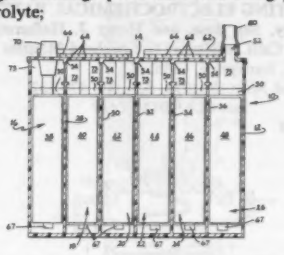
a case;

a plurality of electrical generating cells separated by a plurality of separating walls within said case, each having positive and negative plates, said plates being immersed in a dilute electrolyte;

a plurality of air tubes extending into said cells, each tube extending into one cell and said air tubes each having one end open to atmosphere exteriorly of said case and having the other end open below said electrolyte level in said cell, below said plates and being immersed in said electrolyte;

a gas discharge port disposed on the top of said case above the electrolyte and adapted to be connected to a source of vacuum at the carburetor, each of said cell separating walls having an aperture above the electrolyte;

means disposed within said separating wall apertures for permitting the gases collecting above said plates to pass to said gas discharge port while restraining passage of the electrolyte;



a plurality of intake shrouds positioned above said air tubes, said shrouds having a plurality of apertures communicating a plurality of said tubes with atmosphere;

a gas discharge tube sealably connected at one end to said gas discharge port, said gas discharge tube adapted for connection to the carburetor of the engine; and

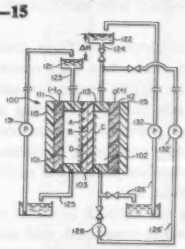
a check valve inserted intermediate the ends of said discharge tube.

4,053,684

METHOD OF OPERATING A FUEL CELL

Ralph Zito, Jr., Westford, and Lawrence J. Kunz, Jr., Fitchburg, both of Mass., assignors to GEL, Inc., Durham, N.C.

Continuation of Ser. No. 296,243, Oct. 10, 1972, abandoned.
This application Nov. 11, 1976, Ser. No. 741,134
Int. Cl.[2] H01M *8/04*
U.S. Cl. 429—15 3 Claims



1. Method of operating a fuel cell comprising,

means forming a first compartment and an anode therein,

means forming a second compartment and a cathode therein, the second compartment being adjacent the first compartment,

means forming a microporous ion diffusion membrane separating said compartments,

a liquid electrolyte in said first compartment and a liquid electrolyte in said second compartment, and an interface between said electrolytes located within said membrane,

one of said electrolytes comprising a fuel dissolved therein and the other of said electrolytes comprising an antifuel dissolved therein, through

the step of establishing a pressure differential between said electrolytes so that there is a pressure gradient between the liquids in a direction to combat undesired transport, which would naturally occur in the absence of specific

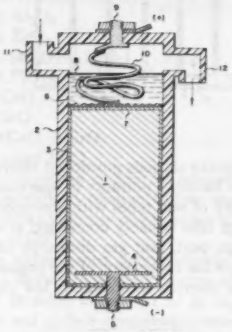
establishment of such combating pressure differential, of an ionic species contained in one of the electrolytes which tends to poison the other electrolyte or electrode of the other electrolyte compartment, if transported thereto, or to poison the membrane if transported therein.

4,053,685

END-REACTING ELECTROCHEMICAL BATTERY

Leroy S. Rowley, San Jose, and Harry J. Halberstadt, Los Altos, both of Calif., assignors to Lockheed Missiles & Space Company Inc., Sunnyvale, Calif.

Filed May 15, 1974, Ser. No. 470,132
Int. Cl.² H01M *2/38*
U.S. Cl. 429—68 **1 Claim**



1. In a reactive metal anode-aqueous electrolyte electrochemical battery wherein said anode is mounted in a battery casing and naturally forms on its surface a protective insulating film in the presence of water, the improvement wherein:

a. said protective insulating film includes at least a portion thereof comprising a reactive surface,

b. a cathode in direct contact with substantially the entire reactive surface,

c. means preventing said electrolyte from contacting any portion of said anode other than said reactive surface, thereby minimizing destructive erosion of said anode by said electrolyte in a non-power producing area of said electrolyte wherein said preventing means comprises said battery casing said battery case being in intimate and fixed direct contact with all surface portions of said anode other than said reactive surface, and

d. means for maintaining said cathode in direct contact with said anode as said anode is consumed, said cathode being freely movable with and following the receding anode reactive surface for maintaining direct contact between said reactive surface and said cathode.

4,053,686

EPOXY SEALED LEAD BATTERY PROBE

Terry Russel Oxenreider, Wernersville, Pa., assignor to General Battery Corporation, Reading, Pa.

Continuation of Ser. No. 593,000, July 3, 1975, Pat. No. 4,010,537. This application Sept. 13, 1976, Ser. No. 722,567
Int. Cl.² H01M *10/48*
U.S. Cl. 429—91 **4 Claims**

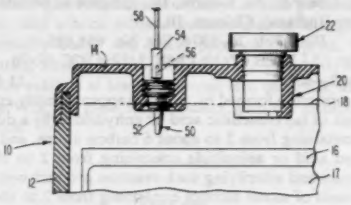
1. An electric storage battery comprising:

a. a case to retain electrolyte up to a preferred level;

b. a cover means for retaining said electrolyte within said case, said cover means further having defined therein at least one bore; and

c. a probe means for sensing said preferred level of electrolyte, said probe means being disposed within said bore, said probe means comprising:

i. a pin; and



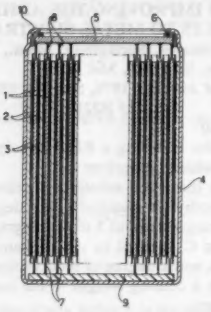
ii. a lead body comprising a plurality of substantially concentric annular projections of decreasing diameters.

4,053,687

ELECTROCHEMICAL CELL

Jean Coibion, Tresses, and Jean Lafaye, Carbon Blanc, both of France, assignors to SAFT-Societe des Accumulateurs Fixes et de Traction, Romainville, France

Filed Oct. 12, 1976, Ser. No. 731,773
Claims priority, application France, Oct. 17, 1975, 75.31839; Oct. 17, 1975, 75.31840
Int. Cl.² H01M *6/10*
U.S. Cl. 429—94 **22 Claims**



1. An electrochemical cell comprising a metal container having a closed base, an open upper end having a rim, a cover, means for effecting a seal between the container and cover, and a compact block positioned within said container comprising an assembly of electrodes of opposite polarity and separator means between such electrodes, one of said electrodes having conductive borders respectively projecting outwardly from opposite ends of said block, said borders resepctively bearing against the cover and base of said container, said borders providing supports for said block between the cover and base of said container.

4,053,688

BATTERY HOLDER

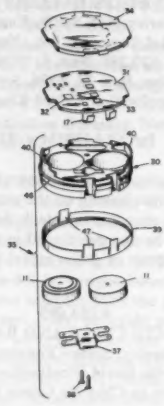
Carroll R. Perkins, 3400 Main St., Santa Ana, Calif. 92707; Jesse F. Cable, III, 4341 Rafael St., Irvine, Calif. 92714, and Joseph Link, 26752 Magdalena Lane, Mission Viejo, Calif. 92675

Filed Dec. 8, 1975, Ser. No. 638,312
Int. Cl.² H01M *2/10*
U.S. Cl. 429—98 **7 Claims**

1. In a modular electronic assembly which has a substrate, on which an integrated circuit is mounted, and a module cap, which is concentrically, slightly larger than the substrate, a

battery holder, which is adapted to be placed in a casing and which holds a plurality of batteries, comprising:

a. a module frame formed from a non-conductive material having a front surface, a sidewall, and a back surface and being concentrically, slightly larger than the module cap, said front surface of said module frame being adapted to receive the substrate thereon, a portion of said sidewall



extending above the periphery adjacent to said front surface of said module frame, and a plurality of holes perpendicular to said front surface adapted to receive the batteries; and

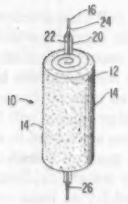
b. means for securing the batteries within said holes coupled to said back surface of said module frame, formed from a conductive material.

4,053,689

CONTACT BETWEEN METAL CAN AND CARBON/GRAPHITE FIBERS IN SODIUM/SULFUR CELLS

Manfred Wolfgang Breiter, Niskayuna, N.Y., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Dec. 20, 1976, Ser. No. 752,489
Int. Cl.² H01M *2/30*
U.S. Cl. 429—102 **10 Claims**



1. A conductor for transferring electricity to and from sulfur or mixtures of sulfur and sodium polysulfides comprising a mat of conducting carbon or graphite in electrically conducting contact with the chromium or molybdenum surface of a chromium or molybdenum coated aluminum substrate.

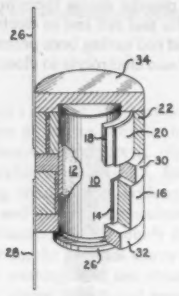
4,053,690

THERMAL CELLS

John R. Backlund, Bloomington, Ill., assignor to National Union Electric Corporation, Stamford, Conn.

Filed Jan. 27, 1954, Ser. No. 406,566
Int. Cl.² H01M *6/36*
U.S. Cl. 429—112 **5 Claims**

1. Multiple thermal cell construction comprising a cylinder having heat source material therein and forming one electrode of a cell, dry electrolyte in contact with the outer surface of said cylinder, a metal band enclosing said electrolyte and forming another electrode of said cell, a metal band on said cylinder in spaced and insulated relation with respect to said electrolyte



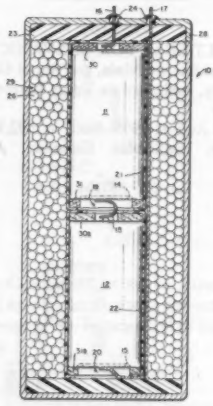
and forming an electrode of another cell in series with said first mentioned cell, dry electrolyte in contact with said band and an outer band contacting said last mentioned electrolyte and forming another electrode of said last mentioned cell.

4,053,691

POROUS LIGHT WEIGHT BATTERY FILLER

Frank L. Ciliberti, Jr., Ossining, N.Y., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Filed Oct. 1, 1976, Ser. No. 728,671
Int. Cl.² H01M *2/00*
U.S. Cl. 429—163 **5 Claims**



1. A battery comprising an outer container, at least one electrochemical cell rigidly encapsulated within said container by a porous structure, said porous structure being comprised of a plurality of discrete pellets adhered to each other, said porous structure having a porosity of at least 20%.

4,053,692

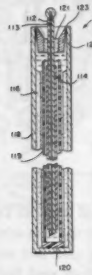
HERMETICALLY SEALED CELLS

Arabinda N. Dey, Needham, Mass., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Continuation-in-part of Ser. No. 314,316, Dec. 12, 1972, Pat. No. 3,945,846, and Ser. No. 664,780, March 8, 1976. This application Mar. 8, 1976, Ser. No. 664,781
Int. Cl.² H01M *2/02*
U.S. Cl. 429—171 **13 Claims**

1. An electrochemical cell having an hermetic seal assembly

for closing the open end of the container for said cell; said hermetic seal assembly comprising a metal rod, a ring shaped glass member permanently concentrically sealed to said metal rod at its upper end, and a metal member permanently sealed to said glass member; said metal rod extending axially within said cell, having liquid passage means therethrough and being an electrical terminal for said cell and an electrolyte fill port, with the upper end of said rod having been permanently closed after the introduction of said electrolyte to close said liquid passage;



said metal rod being in contact with an active electrode material of said cell and being formed of a metal which is different from but chemically compatible with said active electrode material; said glass member having a thermal coefficient of expansion substantially similar to said metal comprising said tube; and said glass member being inert with respect to material contained within said cell; and said metal member being hermetically permanently sealed to said container at said open end.

4,053,693

POLE BOLT SEAL FOR GALVANIC CELLS

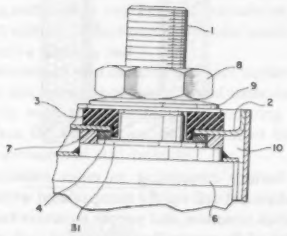
Erich Münch, Frankfurt am Main, and Bernd Gnida, Fischbach, both of Germany, assignors to Varta Batterie Aktiengesellschaft, Germany

Filed Aug. 6, 1975, Ser. No. 602,393

Claims priority, application Germany, Aug. 19, 1974, 7428070[U]

Int. Cl.² H01M 2/06

U.S. Cl. 429—183 **1 Claim**



1. In a sealing arrangement for a galvanic cell having a cell cover, a pole bolt which protrudes through an aperture in the cell cover, and a pole bolt nut, the improvement comprising:

a sealing ring of elastic material which encircles the bolt and which is positioned for compression in response to tightening of the nut,

a spacer ring encircling the sealing ring and positioned to be subjected to pressure in response to tightening of the nut, said spacer ring being substantially inelastic,

said cover, bolt, nut, sealing ring and spacer ring being so positioned and proportioned relative to each other that the spacer ring limits the tightening of the nut, whereby the compression of the sealing ring is also limited by the spacer ring alone, and

annular insulating means encircling the pole bolt between the bolt and the sealing ring.

4,053,694

NICKEL ACTIVATION BATTERY COMPONENT

Ian P. Gutridge, Brierley Hill, Staffs, England, assignor to The International Nickel Company, Inc., New York, N.Y.

Division of Ser. No. 520,258, Nov. 4, 1974, Pat. No. 3,997,364. This application June 23, 1976, Ser. No. 699,055

Claims priority, application United Kingdom, Nov. 13, 1973, 52658/73

Int. Cl.² H01M 4/32

U.S. Cl. 429—223 **3 Claims**

1. As a battery component, an impervious electrically conductive nickel substrate having on the surface thereof in the as activated condition an adherent black deposit of porous beta nickel hydrate and having positioned in the pores of the beta nickel hydrate a deposit of green nickel hydroxide.

4,053,695

LEAD ACID CELLS AND BATTERIES

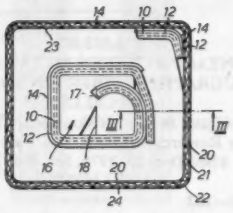
Kenneth Peters, Worsley; Sidney Fewster; Frank Wilson, both of Bolton, and Kevin David Nicolas Kearney, Chobham, all of England, assignors to Chloride Group Limited, London, England

Filed Oct. 29, 1975, Ser. No. 626,778

Claims priority, application United Kingdom, Oct. 31, 1974, 47470/74; May 23, 1975, 22804/75

Int. Cl.² H01M 4/56

U.S. Cl. 429—225 **17 Claims**



1. A sealed lead acid cell characterized in that it has electrodes comprising metallic supports which minimize the evolution of hydrogen and resist deformation under their own weight, the supports for the electrodes being in the form of a mesh or grid affording an integral current collecting strip or bar along at least one edge which will be the top or bottom edge of the structure when assembled in a cell and the supports for the electrodes being made of a lead-calcium-tin alloy containing 0.04 to 0.08% by weight calcium and 0.1 to 0.5% tin, and which are separated by at least one layer of separator material, the support of the positive electrode or electrodes having positive active material deposited thereon, the deposited positive active material being formed from a positive active material paste composition consisting of from 23 to 57 parts by weight of liquids per 100 parts by weight of the lead content of the active material and from 0.01 to 1.0 parts by weight of silica calculated as SiO_2 per 100 parts by weight of active material (calculated at PbO_2) and the support of the negative electrode or electrodes having negative active material deposited thereon, the deposited negative active material being formed from a negative paste active material composition which includes at least 0.1% by weight of lignin derived lignosulphonate material, and in which the capacity of the negative electrodes is arranged to be at least as great as the capacity of the positive electrodes, the thickness of the electrodes is less than 3mm, the thickness of the separator is in the range of 10 to 200% of the thickness of the electrodes and the

volume, E, of electrolyte in the cell in relation to the sum of the pore volume of the separators, X, and the pore volume of the positive and negative active materials, Y, is not greater than 2X + Y.

4,053,696

MANUFACTURE OF VINYLPYRROLIDONE POLYMERS

Karl Herrle, Ludwigshafen; Hermann Gausepohl, Mutterstadt, and Wolfgang Schwarz, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Nov. 17, 1975, Ser. No. 632,653
Claims priority, application Germany, Nov. 30, 1974, 2456807
Int. Cl.[2] C08F *26/10*
U.S. Cl. 526—65 8 Claims

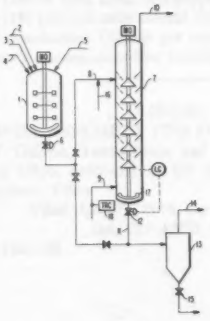
1. A process for the continuous manufacture of polyvinylpyrrolidone having a K value of from 10 to 35 which comprises: continuously polymerizing a monomer consisting essentially of vinylpyrrolidone in at least one continuous polymerization zone at a temperature of from 100° to 300° C., in the presence of from 0.1 to 5% by weight, based on said monomer, of a free radical initiator selected from the group consisting of dicumyl peroxide, di-tert.-butyl peroxide and 2,2di-tert.-butyl peroxybutane, and in an organic solvent selected from the group consisting of methanol, ethanol, n-propanol, isopropanol, dioxane, tetrahydrofuran, chloroform, methylene chloride, tetrachloroethane, hexachloroethane, xylene, cumene, alkylbenzenes or mixtures thereof, said continuous polymerization being carried out at a pressure greater than 1 bar and within a residence time in the polymerization zone of about 3 to 120 minutes.

4,053,697

PROCESS FOR PRODUCING PROPYLENE HOMOPOLYMERS AND COPOLYMERS

Mamoru Asada; Akinobu Shiga, and Kiyoshi Matsuyama, all of Ehime, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jan. 16, 1975, Ser. No. 541,554
Claims priority, application Japan, Jan. 16, 1974, 49-8070
Int. Cl.[2] C08F *4/16*
U.S. Cl. 526—142 5 Claims



1. A bulk polymerization process for producing a homopolymer or a copolymer of propylene, which comprises polymerizing propylene or a mixture of propylene and another unsaturated hydrocarbon monomer in liquid propylene in the presence of a catalyst system consisting essentially of (a) an activated titanium compound obtained by (1) reducing titanium tetrachloride with an organoaluminum compound represented by the formula

$$R_nAlX_{3-n} \quad (I)$$

wherein R represents a straight or branched chain alkyl group having 1 to 18 carbon atoms, an alicylic hydrocarbon group or an aromatic hydrocarbon group, X represents a halogen atom, an n is a value of from 1 to 3, inclusive to obtain a β-type titanium trichloride, (2) reacting the resulting β-type titanium trichloride with an ether, (3) reacting the solid catalyst thus obtained with (i) an organoaluminum compound represented by the formula

$$R'_mAlX_{3-m} \quad (II)$$

wherein R' represents a straight or branched chain alkyl group having 1 to 18 carbon atoms, an alicyclic hydrocarbon group or an aromatic hydrocarbon group, X represents a halogen atom, and m is a value of $0<m<1.5$, followed by further reacting the resulting solid catalyst with an ether, or (ii) titanium tetrachloride and (b) an organoaluminum compound, withdrawing the obtained polymer slurry from the polymerization zone, introducing the polymer slurry into an upper part of a counter-current washing zone and counter-currently contacting the polymer slurry with liquid propylene introduced into a lower part of the washing zone, whereby the polymer and catalyst residue dissolved in the polymer slurry are removed.

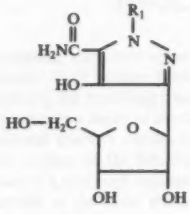
4,053,698

ACYLATION OF PYRAZOFURIN

Gerald E. Gutowski, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 490,627, July 22, 1974, Pat. No. 3,960,836.
This application Feb. 23, 1976, Ser. No. 660,208
Int. Cl.[2] C07D *231/38, 231/40;* C07H *7/06, 13/02*
U.S. Cl. 536—1 1 Claim

1. A process for preparing a pyrazofurin mono-N_1-acylate of the formula



wherein R_1 is C_1–C_6 alkanoyl, comprising treating pyrazofurin with an acylating agent in an alcoholic solvent at a temperature of about 0° to about 30° C. for a period of time of about 30 to about 90 minutes.

4,053,699

FLASH DRYING OF XANTHAN GUM AND PRODUCT PRODUCED THEREBY

Patrick Thomas Cahalan, Champlin; John Allen Peterson, Coon Rapids, and Douglas Arthur Arndt, Champlin, all of Minn., assignors to General Mills Chemicals, Inc., Minneapolis, Minn.

Filed Mar. 31, 1976, Ser. No. 672,187
Int. Cl.[2] C08B *37/00*
U.S. Cl. 536—114 3 Claims

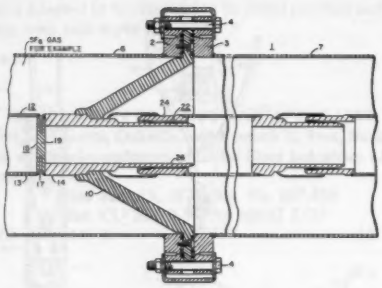
1. In a method of making calcium-xanthomonas gum complex granules comprising the steps of precipitating xanthomonas gum with calcium ion at an alkaline pH to form a complex, adjusting the moisture content of the complex to from 70 to 80% by weight of the complex, the improvement consisting of flash drying the complex at an air temperature of 70° C to 250° C to a moisture content of no more than 12% by weight in a period of about no more than 30 seconds.

4,053,700

COUPLING FLEX-PLATE CONSTRUCTION FOR GAS-INSULATED TRANSMISSION LINES

Jeffry R. Meyer, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 6, 1975, Ser. No. 584,432
Int. Cl.[2] H01B 9/04
U.S. Cl. 174—21 C 5 Claims



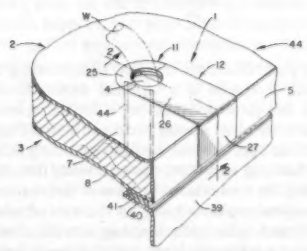
1. A high-voltage gas-insulated transmission-line capable of carrying relatively-heavy currents including a plurality of axially-aligned outer-disposed independent metallic grounded casing sections (6,7), means securing said independent metallic grounded casing sections (6,7) together in end-to-end axially-aligned fashion, a plurality of axially-aligned inner-disposed open-ended tubular high-voltage independent conductors (13,14) disposed centrally within said outer-disposed grounded axially-aligned casing sections (6,7), an insulating gas disposed within the annular space between the inner-disposed conductors (13,14) and the outer-disposed grounded metallic casing sections (6,7), a solid self-supporting flex-plate coupling member (15) interposed between the confronting open ends of two juxtaposed inner high-voltage conductors (13,14) and secured thereto to completely block the open confronting ends thereof, said solid self-supporting flex-plate coupling member (15) having a centrally-disposed, outer peripheral recess (17) thereby resulting in a substantially solid "H"-shaped cross-sectional configuration, whereby the solid inner central core position (19) of said solid self-supporting flex-plate coupling member (15) permits only lateral flexing motion of the inner-disposed conductors (13,14) yet nevertheless can carry relatively-heavy transmission-line currents.

4,053,701

GROMMET ASSEMBLY FOR FURNITURE ARTICLES

LeRoy F. Ogilvie, Youngstown, and Henry F. Hartig, Poland, both of Ohio, assignors to GF Business Equipment, Inc., Youngstown, Ohio

Filed Apr. 27, 1976, Ser. No. 680,884
Int. Cl.[2] A47B 13/00
U.S. Cl. 174—48 13 Claims



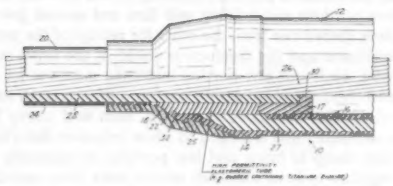
1. A grommet assembly providing a wiring access in a furniture article top having an upper surface, lower surface and outer edge, said top including a cut-out communicating with said outer edge and having an end wall and two side walls, said assembly including a stationary grommet segment within said top cut-out adjacent said end wall and having a first partial wiring access cut-out, a removable grommet segment slidably insertable within said top cut-out into abutment with said stationary grommet segment and having a second partial wiring access cut-out mating with said first partial wiring access cut-out to provide a full wiring access, and mating guide means in said top cut-out and on said removable grommet segment to retain said removable grommet segment in alignment with said stationary grommet segment, said mating guide means including a retainer plate fixedly disposed within said top cut-out and having an inturned flange, and said removable grommet segment includes grooves engageable with said flange.

4,053,702

DIELECTRIC STRESS RELIEF AT A HIGH VOLTAGE CABLE TERMINATION

Roy D. Erickson; Leonard A. Johnson, both of Woodbury, and Edward I. Porwit, St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed July 14, 1975, Ser. No. 595,503
Int. Cl.[2] H02G 15/08
U.S. Cl. 174—73 R 3 Claims



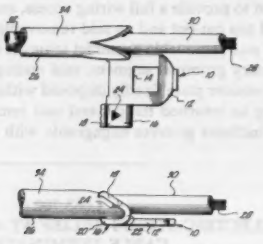
1. Means for relieving dielectric stress at a termination of a shielded and insulated high voltage cable including a housing that defines an opening for receiving a said high voltage cable, which housing comprises a layer of insulative material having a generally cylindrical shape, a conductive high voltage electrode at the inner surface of the housing for making contact with the conductor of a said high voltage cable, and a conductive ground electrode at the outer surface of the housing for conductive coupling to the shielding of said high voltage cable, said ground electrode defining the mouth of the opening in the housing and diverging from the opening; and a tube of homogeneous insulative material having a relatively smooth geometry, being adapted for surrounding an exposed portion of the insulation of a said high voltage cable, and being adapted for positioning in the opening of the housing while surrounding said exposed portion with one end of the tube coaxially contacting the ground electrode at the mouth of the opening and the other end of the tube coaxially contacting the high voltage electrode; said housing characterized by the mouth of the opening being substantially the same diameter as the remainder of the opening; and said tube characterized by consisting of a nonrigid elastomeric material having a permittivity in a range from 10 to 25, characterized by having an outward extending ridge on one end that exceeds the diameter of the mouth of the opening to limit the relative insertion of the tube into the opening, and a conductive nonrigid elastomeric tubular extension integral with the other end of the tube for forming a part of said high voltage electrode, said conductive extension having a lip extending inwardly for contacting an exposed portion of the high voltage conductor of a said high voltage cable and at least a portion of the insulation adjacent said exposed portion of the high voltage conductor of a said high voltage cable.

4,053,703

CLAMPING CONNECTOR

Donald J. Smith, Woodland Hills, Calif., assignor to Smith-Schreyer & Assoc., Inc., Woodland Hills, Calif.

Filed Aug. 12, 1976, Ser. No. 713,718
Int. Cl.[2] H01R *11/08, 5/08*
U.S. Cl. 174—78 **4 Claims**



1. A clamping connector for receiving the ends of small service wires of the type having a conductor core, external insulation and a conductive shield, comprising

a plurality of deformable clamps, each said clamp having a first jaw portion defining a first jaw of said clamp, a second jaw portion defining a second jaw of said clamp and an intermediate portion extending to said first and second jaw portions and holding said first and second jaw portions spaced one from the other for receipt of the external insulation and the conductive shield of the small service wire, each said jaw portion including means at an outer end thereof for increasing purchase on the small service wire when associated therewith, each said clamp being constructed and arranged to allow selective distortion of said clamp to bring said jaw portions permanently close together to hold the small service wire from association therewith and to electrically connect the conductive shield, each said jaw portion including an inwardly extending outer end thereof, said inwardly extending end of said first jaw portion extending outwardly of said second jaw portion to form an interlocking of said inwardly extending ends when said jaw portions are brought permanently close together; and

an attachment plate rigidly fixed to and electrically associated with said deformable clamps.

4,053,704

PLUG AND KIT OF PARTS INCLUDING SAME FOR USE IN FORMING A MOISTURE-PROOF CABLE SPLICE ENCLOSURE

Donald J. Smith, Woodland Hills, Calif., assignor to Smith-Schreyer & Assoc., Inc., Woodland Hills, Calif.

Continuation-in-part of Ser. No. 307,593, Nov. 17, 1972, Pat. No. 3,934,076, which is a continuation-in-part of Ser. No. 171,570, Aug. 13, 1971, abandoned. This application Sept. 19, 1975, Ser. No. 614,912
Int. Cl.[2] H02G *15/08*
U.S. Cl. 174—87 **7 Claims**

1. A plug for use with a vial in a cable splice enclosure, comprising

a body, said body including longitudinally extending grooves for receiving cables and transverse slots extending across said grooves and cutting deeper into said body than said grooves; and

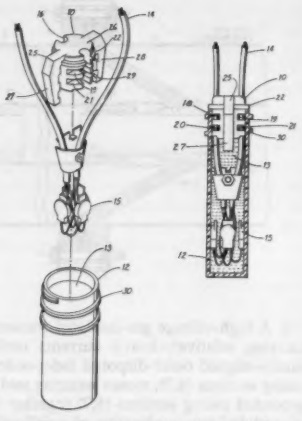
a pair of arms extending outwardly from said body, each of said arms having a depending portion bearing a plurality of teeth directed toward said body for engaging a vial.

6. A kit of parts for forming an enclosure for moisture-proofing cable splices and cable ends associated therewith, comprising

a vial, said vial having a mouth and an interior volume for accepting a cable splice;

a body of sealant contained in said vial for receiving a cable splice and the ends of cables to be positioned in said vial;

a plug having means for accepting a plurality of cables in the immediate promixity of a cable splice, said plug being for fitting within and enclosing the mouth of said vial, said



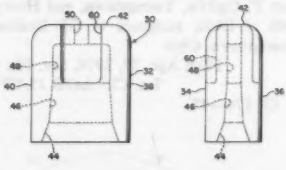
plug having a body capable of extending into said body of sealant to force said body of sealant to deform around said plug and cable ends to fill all passageways leading from the vial, said plug body including longitudinally extending grooves for receiving cables and transverse slots extending across said grooves and cutting deeper into said plug body than said grooves.

4,053,705

TERMINAL CAP

Bradley J. Schmidt, East Dundee, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Oct. 8, 1976, Ser. No. 731,070
Int. Cl.[2] H01R *5/12, 13/44*
U.S. Cl. 174—138 F **5 Claims**



1. A one-piece dielectric terminal straightening cap adapted for use with terminals in a terminal wiring block, said cap including a one-piece body having a double tapered generally rectangular bore open through one end thereof and terminating short of the opposite end, said cap including front, back and side walls forming said bore, the said walls forming said bore being tapered for a substantial portion of their extent relative to two perpendicular planes lying on the axis of said bore, said front, back and side walls forming a wide double tapered throat having a relatively large included angle between opposite wall which blends into a lower included angle portion of said bore, said lower included angle portion having a substan-

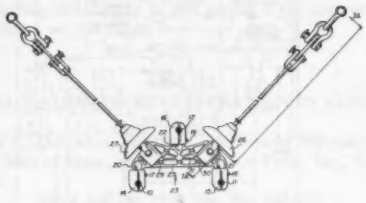
tially greater axial extent than said wide tapered throat and terminates in a rectangular bore having substantially parallel opposed walls for the substantial remaining portion of said bore, the transfer measurement between opposite walls of said rectangular bore being substantially equal to the corresponding complementary cross-sectional measurements of the terminal adapted to be covered by said cap, whereby a two-blade terminal that has been distorted by introduction of wires therebetween is adapted to be returned to its initial position and better contact with said wires insured.

4,053,706

SUSPENSION BRACKET AND APPARATUS

Herbert J. Houston, Oakville, and Kenneth D. Bolt, Burlington, both of Canada, assignors to Slater Steel Industries Limited, Hamilton, Canada

Filed June 18, 1976, Ser. No. 697,476
Int. Cl.[2] H01B *17/10*; H02G *7/00*
U.S. Cl. 174—149 R 11 Claims



1. A suspension apparatus for suspending a bundle of sub-conductors from a support, said suspension apparatus comprising:

a suspension bracket comprising a yoke plate and defining a support plane;

at least one pair of insulator assemblies, each having a major axis lying in said support plane, for suspending said suspension bracket at the lower ends of said insulator assemblies from said support;

said yoke plate having first and second connection portions at opposite sides thereof connected to said insulator assemblies, respectively;

a plurality of clamp means for securing said sub-conductors to said yoke plate;

means pivotally connecting said clamp means to said yoke plate;

at least one of said clamp means being located at the upper side of said yoke plate and between said insulator assemblies; and said yoke plate having attachment means associated with at least one of said insulator assemblies, in alignment with said major axis thereof, for attachment thereto of temporary suspension connector means for suspending said yoke plate upon uncoupling of said one insulator assembly.

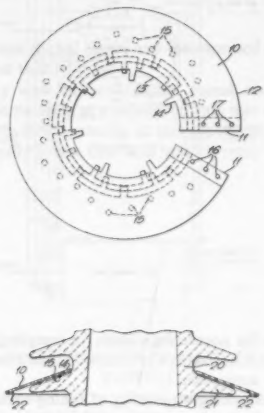
11. A yoke plate for use in suspending a bundle of sub-conductors from a support, said yoke plate being generally planar and comprising first and second connector means for connecting first and second elongated insulator assemblies thereto, so as to lie in the plane thereof; a plurality of clamp means for securing said sub-conductors to said yoke plate; means pivotally connecting said clamp means to said yoke plate; at least one of said clamp means being located at the upper side of said yoke plate and between said connector means; wherein the improvement comprises: attachment means on said yoke plate in direct alignment with at least one of said connector means for attachment of temporary suspension connector means for suspending said yoke plate upon disconnecting of said at least one of said connector means from its respective insulator assembly.

4,053,707

METHOD AND APPARATUS FOR HIGH VOLTAGE INSULATION

Cyril Harold Arthur Ely, Effingham; Peter John Lambeth, Bookham, and John Sidney Thomas Looms, East Molesey, all of England, assignors to Central Electricity Generating Board, London, England

Filed Mar. 29, 1976, Ser. No. 671,295
Claims priority, application United Kingdom, Apr. 7, 1975, 14244/75
Int. Cl.[2] H01B *17/50, 17/60, 17/32*
U.S. Cl. 174—209 41 Claims



1. A method of improving an insulator having a central portion or stem and one or more sheds comprising the step of putting a barrier of dielectric material over the upper surface of a shed but spaced away therefrom, the barrier extending radially outwardly to overhang the periphery of the shed by at least 5 mm around the whole of the shed, the barrier furthermore being spaced radially from the central portion or stem of the insulator over at least a substantial part of the inner periphery of the barrier.

4. An insulator having a central portion or stem and one or more sheds extending outwardly therefrom in combination with a discharge barrier comprising a sheet of dielectric material and positioned around the central portion or stem of the insulator above at least one shed, said sheet being spaced away from the upper surface of the shed, said sheet furthermore being arranged to overhang the shed by extending radially outwardly therefrom for a distance of at least 5 mm, said sheet furthermore being dimensioned to leave a gap between the insulator central portion or stem and the sheet over at least a substantial part of the inner periphery of the sheet.

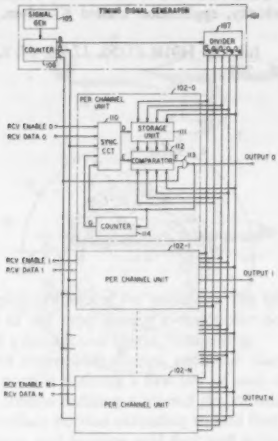
39. A shed for an electrical insulator, comprising a flexible polymeric shed and a barrier of dielectric material, said barrier being spaced away from the upper surface of said flexible polymeric shed and having an inner periphery of greater diameter than the inner periphery of said flexible polymeric shed.

41. An annular barrier for fitting on a shed and about a stem of an electrical insulator, comprising an annular barrier sheet of flexible, dielectric, anti-tracking material, said annular barrier sheet having a substantially radial division, means for joining said barrier sheet to close said substantially radial division and a plurality of projections on one side of said annular barrier sheet to space said annular barrier sheet from the upper surface of the shed.

4,053,708
ASYNCHRONOUS SAMPLE PULSE GENERATOR

LaVerne Charles Hotchkiss, Greensboro, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 17, 1976, Ser. No. 696,872
Int. Cl.² H04L 7/00
U.S. Cl. 178—69.1 12 Claims



1. Apparatus for generating signals for sampling data signals asynchronously received at a prescribed bit rate on at least one channel which comprises:

means for generating a plurality of timing signals in predetermined phase relationship ordered from least significant to most significant and including a timing signal opposite in phase to said most significant timing signal, a first predetermined group of said timing signals including the least significant one through the next to most significant one of said timing signals and the signal opposite in phase to said most significant timing signal, and a second predetermined group of said timing signals including the least significant one through the most significant one of said timing signals;

storage means associated with said at least one channel and being responsive to a first prescribed signal for sampling and storing signals representative of one of said predetermined groups of said timing signals; and

means associated with said storage means and being supplied with said stored signals and with the other of said predetermined groups of said timing signals for generating output signals during intervals in which said first and second predetermined groups of said timing signals are in coincidence, wherein said first and second predetermined groups of said timing signals are in said predetermined phase relationship so that an output signal is generated substantially mid-interval of each data bit incoming on said at least one channel.

4,053,709
TELEPHONE CONNECTOR

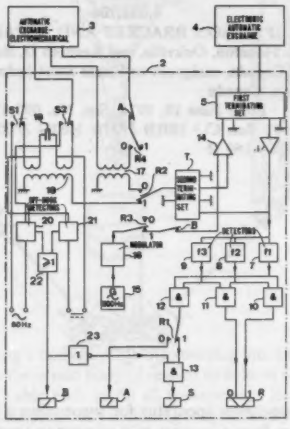
Roger G. Vélu, Franconville; Jean A. Picandet, Paris, and François M. Boullier, Saint-Ouen, all of France, assignors to Jeumont-Schneider, Puteaux, France

Filed Dec. 23, 1975, Ser. No. 643,806
Claims priority, application France, Dec. 31, 1974, 74.43472
Int. Cl.² H04M 7/12
U.S. Cl. 179—18 AD 17 Claims

1. Telephone junctor for the direct inward dialing of a subscriber connected to a first automatic exchange having public network line equipment and extension subscriber equipment by a further subscriber connected to a second, distant automatic exchange capable of transmitting three-frequency signalling towards the said junctor and of interpreting the changes of state of the latter, characterised in that it comprises:

a generator of single-frequency signaling the signals of which are modulated by "on-off keying,"

a first terminating set for two wire to four wire conversion connected at the two-wire side to the second exchange and connected at the four-wire side by its first pair of wires to a circuit for receiving three-frequency signaling the signals of which are transmitted by the second exchange, the said receiving circuit controlling relays through intermediary of logic elements, and to the first channel of the four-wire circuit of a second terminating



set and, connected by its second pair of wires to the output of a two-input summing amplifier the first input of which is subjected to the single-frequency signaling and the second input of which is connected to the second channel of the four-wire circuit of the second terminating set the two-wire side of which is connected either to the extension subscriber equipment or to the public network line equipment of the first exchange, in accordance with the signaling transmitted by the second exchange,

an off hook detecting circuit,

an a.c. source supplying the ringing current, and

a d.c. source feeding the public network line equipment of the first exchange.

4,053,710
AUTOMATIC SPEAKER VERIFICATION SYSTEMS EMPLOYING MOMENT INVARIANTS

Jeram G. Advani, Dayton; Bruno J. Paganini, Centerville, and William J. Hale, Kettering, all of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Mar. 1, 1976, Ser. No. 662,994
Int. Cl.² G10L 1/04
U.S. Cl. 179—1 SB 16 Claims

1. The method of verifying the identity of a person by the use of utterance comparisons comprising the steps of:

a. computing an utterance vector from samples of the person's speech;

b. computing an utterance vector from samples of an imposter's speech;

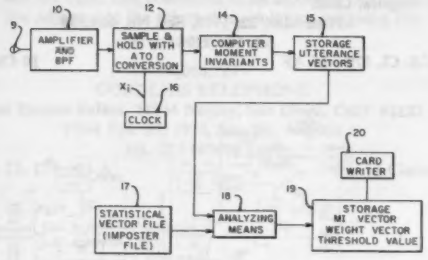
c. analyzing the computed utterance vector of the person and the computed utterance vector of the imposter for deriving weighting factors indicative of the differences therebetween;

d. recording the person's computed utterance vector and said weighting factors on a security card that is issued to said person;

e. comparing the utterance vector recorded on said security card against a most recent computed utterance vector

from the person for determining the differences therebetween;

f. comparing the differences determined in step (e) with said

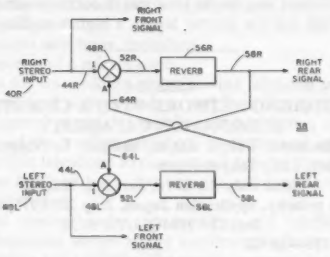


recorded weighting factors and verifying the identity of said person if the comparison is within a first range and rejecting the identity of said person if the comparison is within a second range.

4,053,711
SIMULATION OF REVERBERATION IN AUDIO SIGNALS

Richard E. DeFreitas, Westford, and Samuel Wilensky, Concord, both of Mass., assignors to Audio Pulse, Inc., Bedford, Mass.

Filed Apr. 26, 1976, Ser. No. 680,475
Int. Cl.[2] H04R *5/00*
U.S. Cl. 179—1 GQ **19 Claims**



19. A method of producing reverberation in a plurality of input signals comprising the step of:

applying to the input of each of a like plurality of reverberation means a signal comprising the combination of a respective one of the input signals and the output signal from at least one of the other reverberation means.

4,053,712
ADAPTIVE DIGITAL CODER AND DECODER

Adolf Reindl, Ocean Township, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

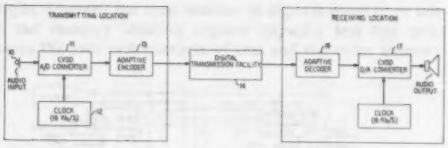
Filed Aug. 24, 1976, Ser. No. 717,732
Int. Cl.[2] G10L *1/06;* **H04N** *1/38*
U.S. Cl. 179—15.55 T **12 Claims**

1. A method of transmitting an analog information signal from a first to a second location, which comprises the steps of:

converting said analog information into a digital information signal using delta modulation at a first bit rate;

monitoring said digital information signal for idle bit patterns which are representative of momentary interruptions in the information content of said analog information signal;

substituting at least one coded bit pattern for each idle bit pattern so detected which exceeds a predetermined interval length with the coded bit patterns having idealized correlation properties and also indicating in which range the number of bits in the idle bit pattern falls, selected from predetermined ranges of unequal length which increase in a nonlinear manner;



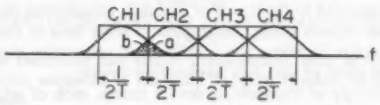
buffering said digital signal and interspersed coded bit patterns; and then

transferring said buffered digital signal and interspersed coded bit patterns at a second bit rate into a digital transmission facility operating at said second bit rate which is substantially lower than said first bit rate.

4,053,713
MULTI-CHANNEL MULTIPLEX DATA TRANSMISSION SYSTEM

Kazuhiko Nitadori, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Feb. 2, 1976, Ser. No. 654,340
Claims priority, application Japan, Feb. 5, 1975, 50-14232
Int. Cl.[2] H04J *11/00*
U.S. Cl. 179—15 BC **10 Claims**

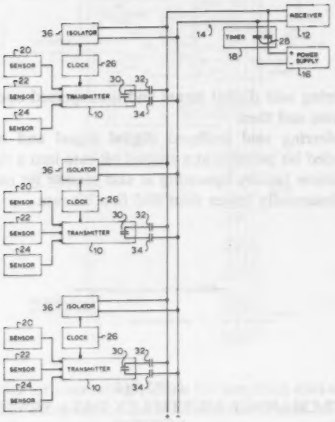


1. A mutli channel multiplex orthogonal VSB transmission system comprising a modulator, a demodulator and a transmission means arranged between the modulator and the demodulator; said modulator comprising at least a two-channel modulator, means for generating a plurality of carrier waves at the frequency interval f_c where f_c is the pulse repetition frequency in each channels; and wherein said two-channel modulator comprises; means connected to each input channel for obtaining the sum and the difference of PAM signals of each pair of input channels, a pair of roll-off filters connected to the output of said means for the sum and the difference respectively, said roll-off filters having the equal amplitude roll-off characteristic less than 50%, a predetermined equal fixed delay and the phase characteristics of 45% and −45° respectively in the amplitude roll-off region, a variable phase shifter for shifting the phase of said carrier waves, a fixed phase shifter for delaying the phase of the output of said variable phase shifter by 90°, a first multiplying means inputs of which being connected to the output of one of said roll-off filters and the output of said fixed phase shifter, a second multiplying means inputs of which being connected to the output of the other roll-off filter and the output of said variable phase shifter, and means for adding the outputs of said first and second multiplying means and providing the output of the two-channel modulator.

4,053,714
ELECTRICAL DATA COLLECTING DEVICE

Robert G. Long, Toronto, Canada, assignor to Canadian PGL Electronics Inc., Scarborough, Canada

Filed Apr. 6, 1976, Ser. No. 674,130
Int. Cl.[2] H04J 3/08
U.S. Cl. 179—15 AL 6 Claims



1. An electrical data transmitting system for collection and transmission of data from a plurality of remote locations comprising:

a plurality of data transmitting devices each having an input, an output and a rechargeable power source;

a plurality of remotely-located data sensors electrically connected to the inputs of said data transmitting devices, said sensors being constructed to sense data at their respective locations and conduct a corresponding signal to the input of said data transmitting device;

a plurality of transmitting device timers, each of which is electrically connected to a respective one of said data transmitting devices;

a data receiving device having an input and being constructed to receive at said input data signals from the outputs of said data transmitting devices;

a data transmission line for electrically connecting the input of said data receiving device and the outputs of said data transmitting devices;

a recharging voltage source for recharging each of said rechargeable power sources through said data transmission line;

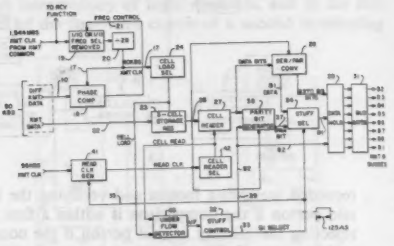
means for setting the transmitting device timer of each of said data transmitting devices to connect for a time interval one of said data transmitting devices to said data transmission line whereby the plurality of data transmitting devices are connected to and disconnected from said data transmission line, one at a time, in a predetermined time sequence; and

a master timer electrically connected to said data transmission line and constructed to be cyclically operable to dictate connection of said recharging voltage source to said data transmission line to recharge said rechargeable power sources for a time interval following sequential data transmission by said plurality of data transmitting devices, said means for setting the transmitting device timers being responsive to operation of said master timer.

4,053,715
STUFFING CHANNEL UNIT FOR TELEPHONE PCM SYSTEM

Paul E. Drapkin, Palo Alto, Calif., assignor to TRW Inc., Los Angeles, Calif.

Filed Mar. 22, 1976, Ser. No. 669,398
Int. Cl.[2] H04J 3/06
U.S. Cl. 179—15 AF 10 Claims

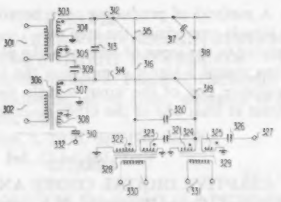


7. A time division transmission system for an asynchronous pulse train having means for converting the pulse repetition rate (PRR) to a higher PRR by the insertion of stuff pulses in a channel word of said time division system to a predetermined plurality of said channel words constituting a frame of said system comprising transmission means for inserting stuff pulses in said pulse train in one of said channel words and for inserting control bits in the same word, and means for receiving said pulse train and decoding a sequence of said control bits for framing said one channel and for detecting and removing said stuff pulses said decoding means sensing control bit sequences of two different lengths the long length corresponding to a low stuffing rate and the shorter length a higher stuffing rate.

4,053,716
SWITCHING NETWORK WITH A CROSSTALK ELIMINATION CAPABILITY

Osamu Enomoto, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed July 26, 1976, Ser. No. 708,455
Claims priority, application Japan, July 28, 1975, 50-91787
Int. Cl.[2] H04Q 3/50, 1/36
U.S. Cl. 179—18 GF 7 Claims



1. A switching network with crosstalk elimination capability comprising:

a group of incoming lines connected to subscribers;

a group of outgoing lines intersecting said incoming line group;

a plurality of switching elements provided at preselected crosspoints formed between said incoming lines and said outgoing lines for interconnecting a desired incoming line and a desired outgoing line in response to a call from a subscriber;

a plurality of transformers each having a primary winding connected to a selected incoming or outgoing line and at least a first secondary winding for generating a signal

reverse in phase to that supplied to the primary winding; and

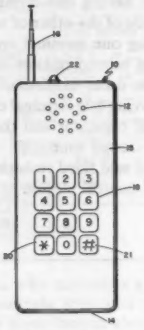
a plurality of first capacitors each having one end connected to each said first secondary winding of the transformers and the other end connected to an incoming or outgoing line adjacent to the selected incoming or outgoing line.

4,053,717

CORDLESS TELEPHONE

David Eugene Snider, 11046 Negley, San Diego, Calif. 92123

Filed Feb. 27, 1976, Ser. No. 662,035
Int. Cl.² H04M *7/04*
U.S. Cl. 179—41 A **14 Claims**



1. A cordless telephone system comprising:

a. a base unit for connection to telephone lines, said unit including means for transmitting and receiving telephone switching signals and audio signals to and from a cordless telephone; and

b. a cordless telephone, including,

a speaker and a microphone,

means for transmitting and receiving telphone switching signals and audio signals to and from the base unit,

first control means for enabling and inhibiting energization of the cordless telephone to enable and inhibit the cordless telephone to receive and detect a "ring" signal from the base unit and to provide said ring signal to the speaker; and

second control means for enabling and inhibiting the transmitting means in the cordless telephone, and for enabling and inhibiting the receiving means in the cordless telephone to provide audio signals from the base unit to the speaker:

CHARACTERIZED BY

the cordless telephone comprising a touch-tone signal generator module for generating switching signals, said module including ten buttons for initiating the generation of signals representing ten numeric characters, and two additional buttons,

wherein one of the two additional buttons is adapted for operating the first control means, and

the second additional button is adapted for operating the second control means.

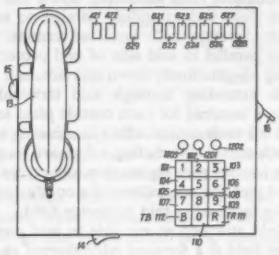
4,053,718

AUTOMATIC TELEPHONE CALL GENERATOR

Oscar Derveaux, Paris, France, assignor to Soprogespar Societe de Promotion et de Gestion de Participations, Paris, France

Filed Oct. 28, 1975, Ser. No. 626,221
Claims priority, application France, Oct. 30, 1974, 74.36317
Int. Cl.² H04M *1/51*
U.S. Cl. 179—90 B **16 Claims**

1. An automatic telephone call generator comprising a keyboard having digital keys emitting digital signals and only two function keys each emitting a special signal, a memory store comprising a plurality of memory location registers having a predetermined capacity, an addressing device for the said memory location registers of the said store, means for writing the digits of the coded call numbers in binary coded form in the said store, a reading register of the digital signals read in the store, a call pulse emitter and a control circuit of the said call pulse emitter, wherein each memory location register can contain one or two call numbers each having a random number of digits, whereby the total number of digits is equal to or less than the memory location register capacity less one unit, wherein the two call numbers of one and the same memory



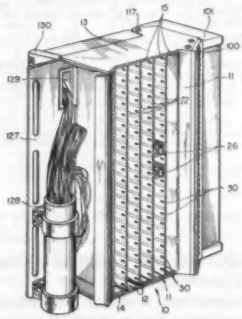
location register are on recording, separated by a first special signal upon actuating one of said function keys, wherein the final part of the memory location register beyond the first number, if there is only one, or beyond the second number if there are two is filled by second special signals upon actuating the other of said function keys, and wherein the apparatus comprises detectors of the first and second special signals, means for commencing the reading of the store either at the start of a selected memory location register or at the first special signal detected by the said first special signal detector and for stopping this reading when a second special signal is detected by said second special signal detector.

4,053,719

CONNECTOR BLOCKS FOR TELECOMMUNICATIONS LINES

George Debortoli, and Detlef Zimmermann, both of Ottawa, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Oct. 27, 1976, Ser. No. 736,174
Int. Cl.² H04M *3/22*
U.S. Cl. 179—98 **13 Claims**



1. A connector block for telecommunications lines, comprising three sections in a unitary structure, including a protector field, a cross-connect field and a test field,

said protector field comprising a rectangular housing having opposed sides, top and bottom, a plurality of partitions

extending longitudinally in said housing in spaced apart parallel array and means on said partitions to define a plurality of protector positions extending in a column between each two adjacent partitions, a back member in said housing, and terminals extending through said back member and each terminal including front portions for connection to a protector inserted in a protector position and rear portions for connection of conductors thereto, said terminals including two outside plant terminals for connections to outside plant equipment and two central office terminals for connection to central office equipment;

said cross-connect field extending down one side of said protector field and extending parallel to said side, and comprising an electrically insulated terminal block spaced from and parallel to said side of said protector field and extending longitudinally down said side, and a plurality of terminals extending through said terminal block, and including a terminal for each outside plant terminal and a terminal for each central office terminal in said protector field, each terminal including a forward part for connection of a jumper wire connection to a central office and a rearward part for connection of a conductor from a central office terminal in said protector field;

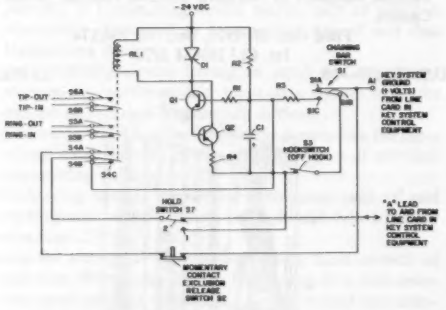
said test field attached at one side to said one side of said protector field at a forward edge thereof and comprising an insulating member extending longitudinally of said protector field and inclined outwardly and rearwardly thereof to connect at its other side to said terminal block of said cross-connect field, and terminals extending through said member, a terminal for each outside plant terminal of said protector field, each terminal including a rear portion for connection of a conductor from a related outside plant terminal and a front portion for acceptance of a test lead.

4,053,720

AUTOMATIC EXCLUSION CIRCUIT

Thomas Joseph Wycheck, and George Edward Leibich, both of Harrisburg, Pa., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Dec. 2, 1975, Ser. No. 636,855
Int. Cl.[2] H04M *1/68*
U.S. Cl. 179—99 **11 Claims**



1. An automatic exclusion circuit for a subset of a key telephone system comprising:

a relay to connect said subset to a selected line of said key telephone system when said relay is activated;

a first source of key system positive ground;

a control circuit coupled to said relay and said first source to control the operation of said relay; and

an "A" lead coupled to said control circuit, said "A" lead disabling said control circuit and, hence, said relay when said key system positive ground is coupled into said subset on said "A" lead and enabling the operation of said control circuit and, hence, activation of said relay when said key system positive ground is not coupled into said subset on said "A" lead;

said control circuit including

a pair of transistors each having base, emitter and collector electrodes interconnected to form a Darlington pair circuit,

a second source of operation potential,

said relay being connected between the collector electrodes of said pair of transistors and said second source,

a diode connected in shunt relation to said relay,

a first resistor having one terminal coupled to the base electrode of one of said pair of transistors,

a second resistor having one terminal connected to the emitter electrode of the other of said pair of transistors,

a capacitor having one terminal connected to the other terminal of said second resistor and the other terminal connected to the other terminal of said first resistor, and

a third resistor having one terminal connected to the other terminal of said capacitor and the other terminal connected to said second source,

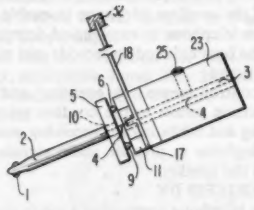
said capacitor and said third resistor provide a time delay circuit for said control circuit.

4,053,721

PIEZOELECTRIC TYPE PICKUP CARTRIDGE FOR STEREO WITH PRESSING AND INTERMEDIATE MEMBERS FOR COUPLING

Kazuo Nishikawa, Tokorosawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 18, 1976, Ser. No. 659,064
Claims priority, application Japan, Feb. 18, 1975, 50-21545
Int. Cl.[2] H04R *1/16*
U.S. Cl. 179—100.41 K **7 Claims**

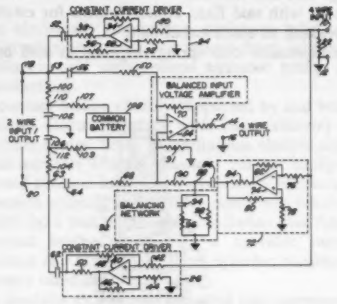


1. A piezoelectric type pick-up cartridge comprising a cantilever having one end mounting a stylus and the other end connected to a base member by a wire, an intermediate member deformable in two orthogonal directions mounted on said base member adjacent the point of connection of said base member and said wire, a press plate means secured to the other end of said cantilever and in contact with said intermediate member for transmitting the movement of said cantilever to said intermediate member, a piezoelectric transducing means for generating electric signals in response to the deformations thereof mounted on said base member and positioned to abut the intermediate member on a side thereof opposite to the side of said intermediate member which contacts said press plate means, a damper means mounted on said base member and on said piezoelectric transducing element, said piezoelectric transducing element being tightly positioned between said damper means and said intermediate member, whereby vibration of said stylus is transferred to said piezoelectric element via said cantilever, said press member and said intermediate member.

4,053,722
SOLID STATE TWO-WIRE/FOUR-WIRE CONVERTER WITH COMMON BATTERY

Lawrence P. Nahay, Cinnaminson, N.J., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 4, 1976, Ser. No. 729,541
Int. Cl.² H04B *1/58*
U.S. Cl. 179—170 NC **2 Claims**



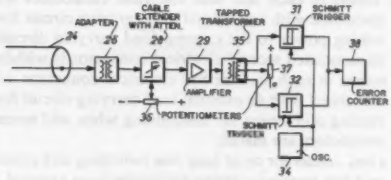
1. A two-wire/four-wire converter system comprising:
four-wire input terminals, four-wire output terminals and a pair of two-wire input/output terminals;
an inverting solid state constant current driver and a non-inverting solid state constant current driver, said drivers in combination connected to transmit and balance a signal from said four-wire input terminals to said two-wire input-/output terminals;
balancing means for use in inhibiting signals from said four-wire input terminals from appearing at said four-wire output terminals, said balancing means comprising a constant current amplifier having an input connected to said four-wire input terminals and a balancing network connected to the output of said constant current amplifier;
amplifier means connected at its output to said four-wire output terminals, and connected at its input to said inverting constant current driver, said non-inverting constant current driver, said balancing means and said pair of two-wire input/output terminals for transmitting signals originating in the converter system at said two-wire input/output terminals and inhibiting signals originating in the converter system at said four-wire input terminals; and
a battery connected to said two-wire input/output terminals.

4,053,723
METHOD AND APPARATUS FOR MEASURING THE BIT ERROR FREQUENCY IN A CABLE CAUSED BY CROSSTALK BETWEEN LINE PAIRS DURING TRANSMISSION OF A 3-LEVEL CODED PCM SIGNAL

Juho Arras, Stockholm; Mats Orjan Mattsson, Farsta, and Walter Herbert Erwin Widl, Bandhagen, all of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed May 14, 1976, Ser. No. 686,561
Claims priority, application Sweden, May 28, 1975, 7506114
Int. Cl.² H04B *3/46*
U.S. Cl. 179—175.3 R **9 Claims**

1. A method for measuring in a cable especially a telephone cable the bit error frequency caused by crosstalk from at least one disturbing pair on which is transmitted for example a PCM signal to a given length of a disturbed pair intended for transmission of a 3-level coded PCM signal, characterized in that
a. the disturbances transferred to the disturbed pair by crosstalk are equalized in correspondence to the given cable length,
b. at times determined by the bit time frequency of the intended PCM signal are determined whether the magnitude of the equalized disturbances exceed a critical disturbing level which negligibly deviates from half the vertical eye opening in the eye pattern of the PCM signal intended for transmission being equalized to the same degree, and

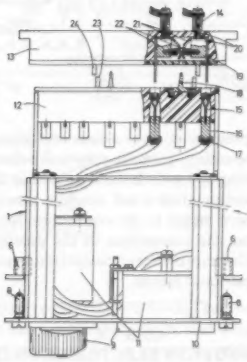


c. during a given time positive outcome of the determination whether the magnitude of the equalized disturbances exceed said critical level are added, the corresponding error frequency which the intended PCM signal would have shown when transmitted via the cable length corresponding to the equalization being proportional to the obtained sum and inversely proportional to said given time.

4,053,724
PANEL AND PLURAL MODULE ASSEMBLY HAVING MECHANICAL KEYING AND MODULAR PLUG STRUCTURE TO ACTIVATE/DEACTIVATE AUTOMATICALLY BRIDGED LOAD CARRYING CIRCUITS

Jesus Gomez Llona, Munguia (Vizcaya), Spain

Filed June 19, 1975, Ser. No. 588,618
Claims priority, application Spain, June 21, 1974, 427518; Feb. 12, 1975, 434666; Feb. 12, 1975, 434667
Int. Cl.² H01R *13/70, 33/54*
U.S. Cl. 200—51 R **6 Claims**



1. A modular switching and control system comprising;
a. a master structure;
b. a plurality of independent switching and control units;
c. said independent switching and control units being of at least first and second different types;
d. said master structure containing mechanical means cooperative with means on said switching and control units for mounting said switching and control units in and removing them from said master structure;
e. said mechanical means being of at least first and second types and having means for preventing mounting of at least said second type of switching and control unit in said first type of mechanical means;

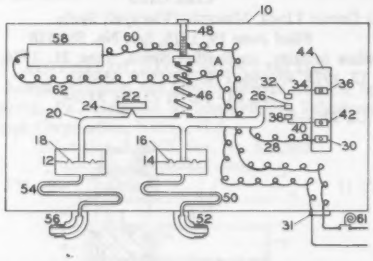
f. a plurality of first electrical connector plates in said master structure;
g. a second electrical connector plate on the rear of each switching and control unit, said second electrical connector plate being adapted to electrical and mechanical mating with at least one of said first electrical connector plates in said master structure;
h. means in each said first electrical connectors which is associated with an external load carrying circuit for maintaining power to the external load carrying circuit when its associated second electrical connector is withdrawn;
i. means in each said second electrical connector which is associated with an external load carrying circuit for interrupting said means for maintaining when said second first connectors are mated;
j. a test connector on at least one switching and control unit said test connector being accessible from external to said unit;
k. a test plug having terminals adapted to mating with said test cnnector; and
l. means on said test connector and test plug for making electrical connections with circuits within said switching and control unit.

4,053,725

PRESSURE SWITCH FOR OUTDOOR REFRIGERATION SYSTEMS

Daniel E. Kramer, 2009 Woodland Drive, Yardley, Pa. 19067

Filed Apr. 7, 1976, Ser. No. 674,572
Int. Cl.² H01H *35/34*
U.S. Cl. 200—81 R **6 Claims**



1. Improved pressure control means comprising a casing, a switch within the casing, pressure responsive means within the casing for actuating the switch during summer ad winter conditions; a connection; restricted conduit means joining the pressure responsive means to the connection for communicating pressure from the connection to the pressure responsive means wherein the improvement comprises; heating means for warming said restricted means.

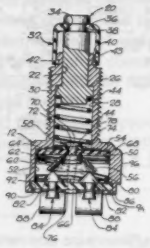
4,053,726

PUSH-BUTTON ELECTRICAL SWITCH

William J. Schaad, Winnetka, Ill., assignor to Indak Manufacturing Corporation, Northbrook, Ill.

Filed Feb. 24, 1976, Ser. No. 660,920
Int. Cl.² H01H *9/04*
U.S. Cl. 200—159 R **3 Claims**

1. A push-button electrical switch,
comprising a casing having an axial generally cylindrical opening therein,
a push button movable in said cylindrical opening in an axial direction,
said push button having a front portion extending through said opening and out of said casing,
said opening having an enlarged axial generally cylindrical rear portion,
an insulating carriage disc movable in said enlarged portion in a generally axial direction,
said casing having an insulating rear wall disposed to the rear of said carriage disc and closing the rear end of said enlarged portion,
said casing having a rearwardly facing annular shoulder at the front end of said enlarged portion,
fixed contact means disposed in said enlarged portion and on said insulating rear wall opposite said carriage disc,
movable contact means mounted on the rear side of said carriage disc and movable therewith into and out of engagement with said fixed contact means for establishing and breaking an electrical circuit,
a first compression coil spring disposed in said enlarged



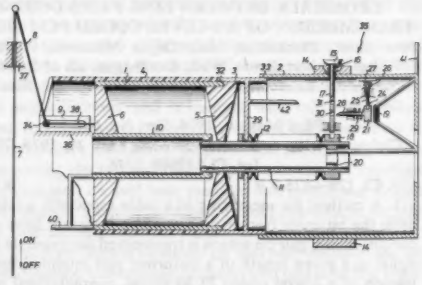
portion and compressed between said insulating rear wall and said insulating carriage disc for biasing said disc and said movable contact means away from said fixed contact means,
said spring initially biasing said carriage disc against said shoulder,
and a second compression coil spring disposed in said opening and compressed between said push button and said insulating carriage disc for initially biasing said push button in a forward direction and for overcoming the strength of said first compression spring and thereby moving said carriage disc rearwardly to bring said movable contact means into engagement with said fixed contact means when said push button is moved rearwardly in said opening toward said carriage disc.

4,053,727

ARC BLOW-OUT SWITCH

Karl Kriechbaum, Kassel, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Jan. 28, 1976, Ser. No. 652,973
Claims priority, application Germany, Jan. 31, 1975, 2503910
Int. Cl.² H01H *33/70*
U.S. Cl. 200—148 A **14 Claims**



1. In a gas current blow-out switch including a stationary compression cylinder; a stationary hollow power contact pin supported in and coaxially with the compression cylinder; an

annular piston surrounding the stationary power contact pin and slidably received at one end of the cylinder for compressing an arc-extinguishing gas in the cylinder; a nozzle stationarily affixed to the cylinder for bounding the cylinder at the other end thereof; and a movable hollow power contact pin supported coaxially with the stationary contact pin and passing through the nozzle; the movable contact pin having a closed position in which it engages the stationary contact pin and an open position in which it is separated from the stationary contact pin and in which compressed gas from the cylinder flows between the separated contacts; the improvement comprising:

a. an electrically conducting stationary tube arranged in axial alignment with and spaced from said compression cylinder; said compression cylinder being electrically conducting;

b. a contact bridge slidably supported by and being in continuous electric contact with said stationary tube; said contact bridge being in continuous electric contact with said movable contact pin; said contact bridge having a closed position in which it electrically contacts said compression cylinder and an open position in which it is separated from said compression cylinder; said tube and said contact bridge constituting a movable rated current contact and said compression cylinder constituting a stationary rated current contact;

c. an insulator cylinder surrounding said compression cylinder and being slidable thereon; said insulator cylinder being coupled to said contact bridge for shifting said contact bridge upon motion of said insulator cylinder;

d. a spring connected to said contact bridge and said movable contact pin to urge said movable contact pin towards its said open position upon displacement of said contact bridge towards its said open position;

e. a carriage shiftably arranged on a support;

f. a drive member secured to said carriage and being displaceable between two limits with respect to said carriage; said drive member being arranged for displacing said carriage after said drive member reached either one of said limits;

g. means connecting said drive member to said piston for effecting displacement of said piston by said drive member;

h. means connecting said carriage to said insulator tube for effecting diaplacement of said insulator tube by said carriage; and

i. means for moving said drive member.

4,053,728

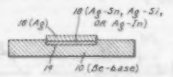
BRAZED JOINT BETWEEN A BERYLLIUM-BASE PART AND A PART PRIMARILY OF A METAL THAT IS RETRACTABLE WITH BERYLLIUM TO FORM A BRITTLE INTERMETALLIC COMPOUND

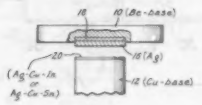
Joseph L. Talento, Media, and Carl C. Popadick, West Chester, both of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Oct. 24, 1975, Ser. No. 625,630
Int. Cl.[2] H01H *1/02*; C22C *5/06*
U.S. Cl. 200—267 **27 Claims**

1. In combination, a first part that is primarily of beryllium, a second part that is primarily of a metal that forms brittle intermediate compounds with beryllium at temperatures above a predetermined level, and a brazed joint between said first part and said second part that is made using temperatures above said predetermined level, said brazed joint comprising:

a. a first layer of brazing alloy in contact with said first part and brazed thereto, said brazing alloy just prior to being brazed to said first part consisting essentially of silver and a minor constituent selected from the group consisting of tin, silicon, indium and combinations of two or more of said element minor constituents; the tin being present in a range of 4 to 15% by weight of the alloy in the case of a silver-tin alloy; the silicon being present in a range of 1 to 5% by weight of the alloy in the case of a silver-silicon alloy; the indium being present in a range of 6 to 25% by weight of the alloy in the case of a silver-indium alloy; and the combination being present in such a weight percentage that the alloy has a solidus temperature of between 675° C and 900° C in the case of an alloy of silver and said combination of elemental minor constituents;





b. a second layer contacting said first layer and brazed thereto; said second layer being of a material that just prior to being brazed to said first layer consists essentially of silver,

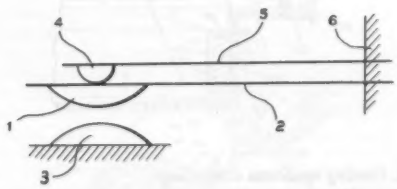
c. and means forming a brazed connection between said second layer and said second part.

4,053,729

METHOD AND ARRANGEMENT OF MASSES AVOIDING CHATTERING

Lothar Reiter, Johann Straussgasse 27, A-1040, Vienna, Austria

Filed Mar. 19, 1976, Ser. No. 668,768
Int. Cl.[2] H01H *3/60*
U.S. Cl. 200—288 **5 Claims**



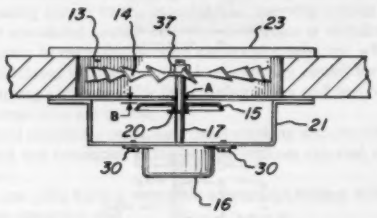
1. An electrical contact device having two contact members each of which has a specific elasticity and weight, at least one of said contact members being movable, additional members having different weights and elasticities arranged in relation to one of said contact members in the direction of the push from the rear side of said at least one contact member comprising means for taking over the kinetic energy from said contact members in said pushing direction starting with said at least one movable contact member, said additional members weights decreasing and said elasticities increasing in the direction of said push providing an energy loss factor which increases in the direction of said push whereby the product of said weight times said elasticity of said at least one contact member and of each of said additional members is approximately equal to avoid rebound of said movable contact member and effectively transferring the kinetic energy upon impact caused by said contact members.

4,053,730

MICROWAVE OVEN SHAFT SEAL

David Alan Baron, Edina; Donald Carl Naab, Plymouth, and James Ronald Hampton, Brooklyn Center, all of Minn., assignors to Litton Systems Inc., Beverly Hills, Calif.

Filed May 17, 1976, Ser. No. 686,709
Int. Cl.[2] H05B 9/06
U.S. Cl. 219—10.55 F 12 Claims



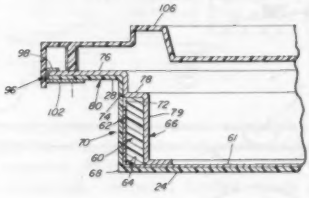
1. In a microwave oven having a plurality of metal walls and a door joined to form an oven cavity, a source of microwave energy adapted to provide a microwave energy field; energy deflecting means adapted for rotational movement in said energy field; driving means located outside of said cavity and having a shaft extending through one of said walls, said deflecting means being operably connected to said shaft, the improvement comprising energy seal means positioned on said shaft between said wall and said motor.

4,053,731

MICROWAVE ENERGY OVEN SEAL

Richard A. Foerstner, Iowa City, Iowa, assignor to Amana Refrigeration, Inc., Amana, Iowa

Continuation of Ser. No. 479,379, June 14, 1974, abandoned.
This application Jan. 8, 1976, Ser. No. 647,685
Int. Cl.[2] H05B 9/06
U.S. Cl. 219—10.55 D 15 Claims



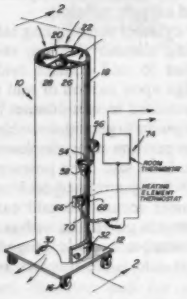
1. Heating apparatus comprising:
an enclosure;
means for energizing said enclosure with electromagnetic wave energy predominantly adjacent a predetermined operating frequency;
said enclosure comprising a wall member having an access opening communicating with said enclosure;
a door for closing said opening;
an energy escape seal comprising at least portions of said door and access opening peripheral walls and forming a propagation path for said energy extending from a first region adjacent to the interior of said enclosure and to the peripheral edges of said opening to a second region outside said seal;
said seal having a first dielectric loaded frequency responsive structure coupled to said path comprising first substantially low impedance means electrically spaced a distance substantially equal to an integral number of one-half wavelengths at said operating frequency from said first region and a second portion of said path communicating with the first path portion and defined at least in part by opposing adjacent wall surfaces of said door and wall members when said door is closed;
said second path portion terminating at said second region adjacent to the outer peripheral edges of said door;
a second dielectric loaded frequency responsive structure coupled to said second path comprising second substantially low impedance means electrically spaced from said second region by a distance substantially equal to an integral number of half wavelengths of said frequency; and
said first and second frequency responsive structures being substantially resonant at said predetermined operating frequency and coupled electrically to said path at coupling regions in said path which are spaced apart along said path for reflecting low impedances to said first region at the operating frequency of said apparatus.

4,053,732

PORTABLE ELECTRIC ROOM AIR HEATER

Frank H. Carter, 428 North St., Taft, Calif. 93268

Filed Nov. 5, 1975, Ser. No. 629,616
Int. Cl.[2] H05B 1/00; F24H 3/08; F28D 15/00; F24D 13/04
U.S. Cl. 219—365 2 Claims



1. A room air heater comprising a vertically disposed, elongated tubular housing having air inlet means adjacent the upper end thereof and air outlet means adjacent the lower end thereof, fan means in said housing for circulating room air downwardly from the air inlet means adjacent the ceiling to the air outlet means, a heat exchange coil disposed within said housing, a heat exchange air containing tank disposed within said housing and having its upper and lower ends communicated respectively with the remote ends of the heat exchange coil for circulation of heat exchange air from the tank, through the coil and back to the tank, said coil and tank being filled with compressed air serving as the heat exchange air with the compressed air being at approximately 15 psi, a heater element disposed in the tank for heating the heat exchange air therein for causing circulation of such air through the coil and tank whereby room air passing over the coil and tank will be heated, said fan means being located adjacent the upper end of the housing, said tank being vertically elongated and disposed in the lower portion of the housing in peripherally spaced relation thereto and above the air outlet means, said heat exchange coil being disposed below the room air inlet means and above the tank with the heat exchange coil being in the form of a helically coiled tube peripherally spaced from the interior of the housing so that air passing downwardly between the heat exchange coil and housing and between the tank and housing will maintain the housing in a substantially cool condition thereby enabling hand contact with the housing without injury due to burning, said heating element being an elongated electric resistance-type heating rod disposed longitudinally in the tank for heating the compressed air during vertical movement thereof in the tank, thermostatic control means for controlling operation of the heating element and fan means, and a supporting base for the housing with the housing being rigidly secured

thereto, said supporting base extending peripherally of the housing and being provided with supporting wheel means thereon to enable the heater to be easily moved from one location to another thereby eliminating installation cost, said air outlet means including circumferentially spaced notched openings formed in the lower end of the housing at its juncture with the base, said housing including a lateral opening provided with a closure door adjacent the lower end thereof, a pan of less height than the air outlet means, said pan having a quantity of water and antiseptic therein and disposed interiorly of the housing and resting on the supporting base in the flow path of air exiting from the air outlet openings for impinging the air onto the surface of the water for vaporizing and entraining some of the water and antiseptic therein.

4,053,733
TEMPERATURE CONTROL DEVICE

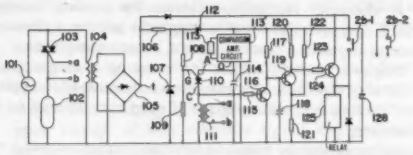
Tomoji Murata, and Masayuki Maese, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed July 16, 1975, Ser. No. 596,243

Claims priority, application Japan, Aug. 6, 1974, 49-90438; Apr. 30, 1975, 50-52697

Int. Cl.² G05D *23/24*

U.S. Cl. 219—494 **14 Claims**



1. A temperature control device for controlling the temperature of a portion to be heated by a heating element to which electric power is supplied, the device comprising:

a pulse generating means for generating pulses with the intervals between the pulses varying in accordance with the temperature of the portion to be heated by the heating element,

a switching means coupled to said pulse generating means for being supplied with the pulses from said pulse generating means and for controlling the electric power supplied to the heating element in accordance with the pulse intervals, and

a sensing means coupled to said pulse generating means for sensing a specific pulse interval at which the temperature of the portion to be heated has reached a predetermined level and upon sensing said specific interval, said sensing means generating a signal indicative of completion of warming-up of the portion to be heated as its temperature reaches the predetermined level.

4,053,734
CURVE READING METHOD AND APPARATUS

Soichiro Yasunaga, 2-28, Denenchofu, Ohta, Tokyo, Japan

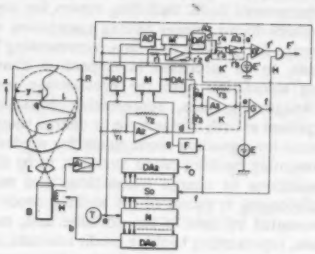
Filed June 22, 1976, Ser. No. 698,760

Claims priority, application Japan, June 23, 1975, 50-75686; Oct. 3, 1975, 50-118798

Int. Cl.² G06K *11/02;* B22D *7/10;* G11B *5/09*

U.S. Cl. 235—61.6 A **8 Claims**

1. A method of reading an optically visible curve line carried on a recording medium and providing an indication of the meandering of the curve line which method comprises the steps of scanning at a fixed cyclical rate transverse segments of said recording medium with a photoelectronic scanning beam while moving the recording medium relative to said beam, to generate a video output signal containing for each scanning period a voltage train varying in accordance with changes in the optical density of the corresponding scanned segment across the medium and which contains at least one pulse produced when the scanning beam *c* crosses the curve line, additively combining each such voltage train after inversion of its polarity with the voltage train generated during a preceding scanning period to produce an output signal detecting when variations in the two voltage trains being compared deviate out of synchronism or in magnitude, comparing this output signal with a fixed reference signal of a magnitude higher than noise components to produce an output pulse whenever such output



signal exceeds the reference signal, driving a binary counter having a digital output in synchronization with the rate of scanning of the record medium and initiating a readout of the instantaneous value carried by such counter upon the occurrence of said output pulse, said value corresponding to the time lapse between the start of a scanning period and the occurrence of said output pulse which corresponds to the location of the curve line segment above a base time.

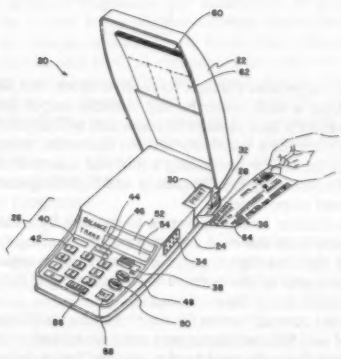
4,053,735
ASSURED-CHECK COMPUTER-BASED BANK CREDIT DISBURSING SYSTEM

James N. Foudos, 2 Helm Court, Towson, Md. 21204

Filed Aug. 7, 1975, Ser. No. 602,769

Int. Cl.² G06K *1/20;* G06F *7/38;* B44B *5/00*

U.S. Cl. 235—61.9 R **1 Claim**



1. A banking system for controlling the dispensing of data, representing amounts of guaranteed credits, usable in purchasing transactions and the like, comprising: a fixed unit for retention under bank control in a bank, a portable unit for carriage by a user of banking services of said bank for use in making purchases; connective means for transferring data, representing banking credit amounts, from the fixed unit to the portable unit to prepare the portable unit for use in making purchases, including means on the respective fixed unit and portable unit for uniquely associating the fixed unit with the portable unit as a prerequisite to said transfer of data, representing banking credit amounts, means in the portable unit for selectively limiting operation of the portable unit to a particular user, including: means in the portable unit for demanding entry of a user-

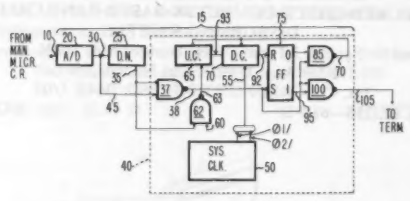
identifying disbursement code into the portable unit, means associated with said means for demanding for affording a predetermined number of opportunities at spaced times for correct entry of a said disbursement code, means having association with said means for affording for disabling the portable unit upon failure of a correct entry of a said disbursement code following said predetermined number of opportunities; means in the portable unit for dispensing said data, representing banking credit amounts, from the portable unit upon correct entry of a said disbursement code, including means for imprinting amounts on check forms; means having association with the dispensing means for preselecting data, representing banking credit amounts, to be dispensed in respective transactions; means having association with the preselecting means for selectively designating data, representing banking credit amounts, dispensed as cash transactions or charge transactions; including means for signalling requirement for predesignation of data, representing banking credit amounts, to be dispensed as cash transactions or charge transactions and means for preventing dispensing in excess of the banking credit amount balance represented by data in the portable unit, means for indicating data, representing banking credit amounts, involved in each transaction, and means for indicating data, representing banking credit balance, in the portable unit prior and subsequent to each said transaction.

4,053,736

DIGITAL RATE COMPENSATOR FOR A CARD READER

Eugene F. Banka, and Gerald J. Lehner, both of Livonia, Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Apr. 2, 1976, Ser. No. 672,999
Int. Cl.[2] G06K *7/08, 7/10;* **G11B** *25/04, 5/09*
U.S. Cl. 235—61.11 D **21 Claims**



1. An apparatus enabled to receive clock and data components from a card reader having variable output data rates for determining a data passage window that will adjust in or out to compensate for a relatively uneven data rate, comprising:

clock means for generating a first and a second digital pulse at a relatively low frequency and high frequency response level respectively;

first counter means operative to be reset by a clock component from the card reader for incrementing upon receipt of the first digital pulse from said clock means for measurement of the current temporal interval between clock signals from the card reader;

second counter means for receiving the transferred contents of said first counter means upon receipt of a clock component from the card reader, and for being decremented by each received second digital pulse from said clock means for measuring the current data passage window that is a predetermined proportional subset of the temporal interval as calculated between the preceeding set of clock signals from the card reader; and

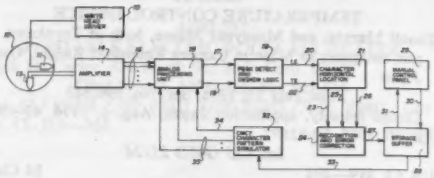
flip-flop means operative to be enabled to its set state by a clock component from the card reader after said second counter means has zero decremented for indicating the allowable beginning of the data passage window, and further being operative for enabling to its reset state upon receipt of a zero decremention signal from the second counter means for indicating the predetermined end of the data passage window, wherein said flip-flop means further includes gating means operative upon concurrent receipt of inputs of signals from the card reader and the reset state of said flip-flop means for outputting to said first and second counter means, a signal indicative that the received signal from the card reader was a clock component.

4,053,737

MAGNETIC READER FOR BAR ENCODED CHARACTERS

James O. Lafevers, and Charles T. Kao, both of Richardson, Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.

Filed June 25, 1976, Ser. No. 700,027
Int. Cl.[2] G06K *7/08, 7/14, 9/18*
U.S. Cl. 235—61.11 D **15 Claims**



1. A character recognition system for reading bar-space encoded characters printed in magnetic ink on a document surface as it passes a reading station, which comprises:

a. magnetic sensing means for scanning a character and forming bipolar sensor responses indicative of the passage of leading and trailing edges of magnetic material on said surface;

b. analog processor means in electrical communication with said magnetic sensing means for forming normalized leading edge and trailing edge waveforms from said bipolar sensor responses;

c. edge detecting and digitizing means for detecting a character stroke from said leading edge and said trailing edge waveforms and for producing leading edge and trailing edge digital signals;

d. deskew logic means receiving said leading edge and trailing edge digital signals from said edge detecting means for merging duplicate edge signals caused by any oblique scanning of said character;

e. means in electrical communication with said deskew logic means for detecting and repairing missing character stroke edges and missing character strokes from said leading edge and said trailing edge digital signals; and

f. character recognition means receiving corrected leading and trailing edge digital signals from said error correction means for identifying said character.

4,053,738

PROGRAMMABLE DATA ENVELOPE DETECTOR

Edward Roald Besenfelder, Phoenix, and Steve Garner Cantrell, Glendale, both of Ariz., assignors to Honeywell Information Systems Inc., Phoenix, Ariz.

Filed Sept. 27, 1976, Ser. No. 727,309
Int. Cl.[2] G06M *3/02*
U.S. Cl. 235—92 PB **2 Claims**

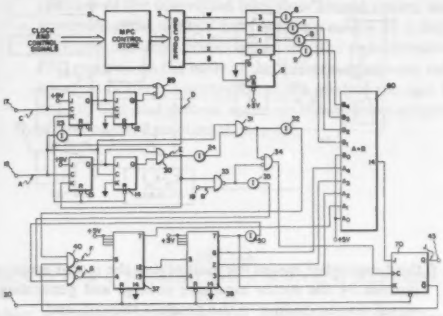
1. Apparatus for detecting the presence of a data envelope containing a plurality of preamble pulses, a plurality of data pulses, and a plurality of postamble pulses, for use with a source of pulses and a source of timing signals, said pulses and said timing signals being in substantial synchronization with one another, said apparatus including

means responsive to said pulses and to said timing signals for counting said pulses and said timing signals, said counting means generating a first signal indicative of the number of preamble pulses which have been counted and generating a second signal after a predetermined number of timing

signals have been counted subsequent to counting the last pulse in said postamble;

a programmable store for storing a plurality of program instructions including at least one instruction indicating a predetermined number of preamble pulses;

means for decoding said at least one instruction and for generating a decoded signal indicating said predetermined number of preamble pulses;



means for comparing said first signal and said decoded signal and generating a compare signal when said first signal and said decoded signal are equal;

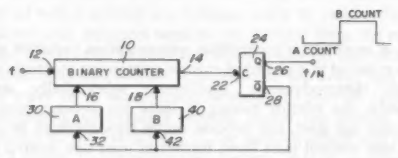
latching means responsive to said compare signal from said comparing means to said second signal from said counting means, said latching means generating a first output signal upon receipt of said compare signal and generating a second output signal upon receipt of said second signal.

4,053,739

DUAL MODULUS PROGRAMMABLE COUNTER

Robert Lynn Miller, Streamwood, and Robert Neal Weisshappel, Sleepy Hollow, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 11, 1976, Ser. No. 713,470
Int. Cl.² G06F *15/20*; H03B *3/04*
U.S. Cl. 364—703 **5 Claims**



1. A multiple modulus counter for dividing a signal having a frequency *f* by a divisor $N = M_1 + M_2 + \ldots + M_x$, where N, M_1, M_2, . . . , M_x are selected numbers, comprising:

counter means including an input for receiving the signal to be divided, an output for producing a signal representative of the count of signals received at the input, and means to input a preset count state;

a plurality of M_x preset means, each actuable to preset one of the numbers $M_1 \ldots M_x$ into the counter means;

control means responsive to the count state at the counter output to sequentially actuate a successive one of the preset means in response to the counter counting to the count preset into the counter by the preceding preset means, the control means producing an output waveform having transitions corresponding to the actuation of predetermined preset means,

whereby the control means output waveform is of a frequency *f*/N.

4,053,740

VIDEO GAME SYSTEM

Lawrence David Rosenthal, 7146 Saroni Drive, Oakland, Calif. 94611

Filed Dec. 22, 1975, Ser. No. 643,154
Int. Cl.² A63F *9/00*; G06F *3/14, 15/44*
U.S. Cl. 364—705 **14 Claims**

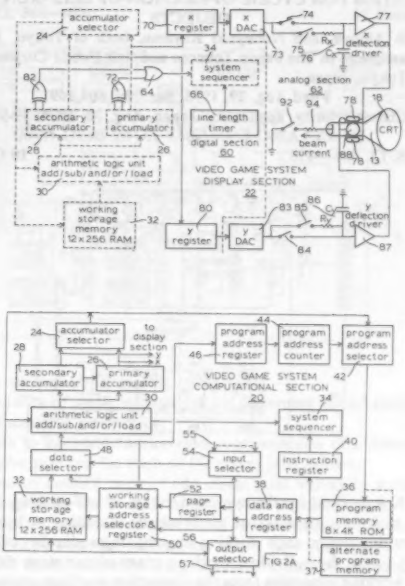


FIG 2A

1. A method of implementing a computational system and a display system with a shared single digital processor to provide a visual simulation system calling for active participation by operators wherein realistic visual simulations of objects are drawn from a series of line segments on the display screen of a cathode ray tube in accordance wih simulation rules and operator commands, said method comprising the steps of

repeatedly calculating within said system display parameters needed to specify said series of line segments, and

repeatedly displaying said series of line segments on said display screen in accordance with said display parameters to provide said visual simulations of objects which may move and change size, shape and orientation as said simulation progresses;

for each line segment;

calculating Cartesian coordinates of a starting point of said line segment and calculating component values defining said line segment relative to its said starting point from said data and said operator commands in accordance with said simulation rules;

displaying said line segment on said screen by:

convering said Cartesian coordinates into deflection voltages directly related to the magnitudes of said Cartesian coordinates;

charging networks having the same time constant to the respective levels of said deflection voltages;

positioning a drawing beam in said cathode ray tube at a starting point of said line segment on said display screen with said deflection voltages to which said networks have charged;

converting said line component value into drawing voltages directly related to the magnitudes of said values;

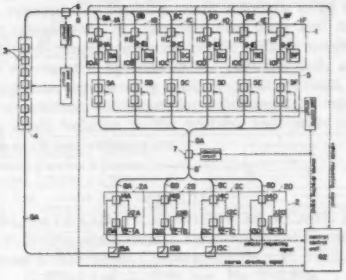
turning on said beam to start drawing said line segment on said display screen and applying said drawing voltages to said charged networks to deflect said beam along the display locus of said line segment being drawn; and

turning off said drawing beam in accordance with said drawing duration gating signal when a terminal end of said line segment has been reached by said drawing beam.

4,053,741
SYSTEM FOR CYCLIC OPERATION OF SELF-RUNNING OBJECTS

Koh Ainoya, and Nobuyuki Koyama, both of Tokyo, Japan, assignors to The Japan Tobacco and Salt Public Corporation, Tokyo, Japan

Filed Aug. 29, 1975, Ser. No. 609,169
Claims priority, application Japan, Aug. 30, 1974, 49-98907
Int. Cl.[2] A24C *5/35*; G06F *15/46*; B65G *47/00*
U.S. Cl. 364—478 **10 Claims**



1. A method for the cyclic operation of self-running objects in a circular network of guide means including at least two working stages, each working stage having a plurality of working zones, the individual working zones of one stage differing in working capacities from the respective working zones of the succeeding stage, said method comprising the steps of feeding the self-running objects one after another along the guide means to the working zones of the first stage upon requests for the objects from the first stage working zones; effecting first working operations in association with the objects fed to the respective first working zones; pooling the objects after completion of the first working operations at the first stage working zones, feeding the objects pooled, one after another, along the guide means to the working zones of the second stage in response to requests for the objects from the second stage working zones; effecting second working operations in association with the objects fed to the second stage working zones; and pooling the objects after completion of the second working operation at the second stage working zones for further feeding of the objects to the working zones of the first stage.

4,053,742
ENERGY MEASURING SYSTEMS ADAPTED FOR USE IN CONJUNCTION WITH LOAD MOVING AND WEIGHT INDICATING DEVICES

John F. Halase, III, Boardman Township; Homer P. Halsey, Poland Township, both of Mahoning County, Ohio, and Robert L. Troup, Highland, Ind., assignors to Youngstown Sheet and Tube Company, Youngstown, Ohio

Filed Dec. 20, 1976, Ser. No. 752,564
Int. Cl.[2] B66B *19/00*; G01R *21/00*; G06G *7/48*
U.S. Cl. 364—506 **8 Claims**

1. A system comprising movable load-supporting means, motor driving means, and connecting means connecting said motor means to said load-supporting means, which further comprises apparatus for measuring the energy expended to move said load-supporting means and any load thereon from a first position to a second position, said apparatus comprising:

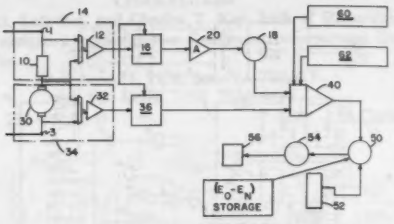
a. means for measuring the motor armature current;

b. means for measuring the voltage across the motor armature;

c. first multiplier means for generating an electrical signal corresponding to the square of the motor current;

d. inverter means for converting the polarity of the electrical signal from said multiplier means (c);

e. second multiplier means for multiplying the signal from said inverter means (d) by the electrical resistance of the motor armature and generating a signal corresponding to the product thereof;



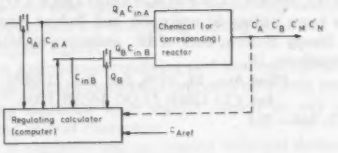
f. third multiplier means for multiplying the motor armature current by the motor armature voltage and generating a signal corresponding to the product thereof; and

g. integrating device means for integrating the signals from said second (e) and said third (f) multiplier means and producing a voltage corresponding to the energy required to move said load-supporting means and any load thereon.

4,053,743
METHOD FOR CONTROLLING THE PH AND OTHER CONCENTRATION VARIABLES

Antti Johannes Niemi, Yrjo Liipolantie 5, Kauniainen, Finland

Filed Feb. 18, 1976, Ser. No. 658,897
Int. Cl.[2] G06F *15/46*; G05D *11/08*
U.S. Cl. 364—500 **12 Claims**



1. A method for controlling concentration variables of process material in a chemical reactor containing reactants which reach thermodynamic equilibrium substantially simultaneously, the reactor having at least one process inlet flow through the inlet, one process outlet flow through an outlet, and one control inlet flow, further at least one desired outlet concentration being provided, the method comprising the steps of:

a. measuring the concentration of at least one reactant of the process material in the process inlet flow, and the concentration of a reactant of a control material in the control inlet flow;

b. providing a residence-time distribution function for the process material flow from said inlet to said outlet, and a residence-time distribution function for the control material flow from said control inlet to said outlet;

c. calculating an apparent outlet concentration of said at least one reactant of the process material and an apparent outlet concentration of said reactant of the control material with the aid of the respective measured inlet concentration and the respective residence-time distribution function in accordance with the following relationship:

$$C_i(t) = \int_{-\infty}^{t} g(t-\theta)C_{in.\,i}(\theta)d\theta;$$

g = residence-time distribution (weighting function)
C_i = concentration of component i in the outlet channel
C_{in} = inlet concentration
$t,0$ = time variables

d. assuming thermodynamic equilibrium and utilizing said provided desired outlet concentration of the preamble as well as said apparent outlet concentration of said at least one reactant of the process material in step (c), calculating a desired apparent concentration of said reactant of the controlled inlet flow at said outlet; and

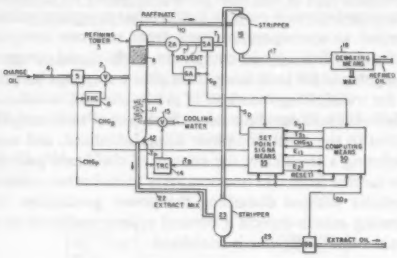
e. controlling the control inlet flow by means of a feedback control, like a proportional, integral and derivative PID control, on the basis of the difference between said apparent outlet concentration of the control reactant in step (c) and said desired apparent outlet concentration of said control reactant in step (d).

4,053,744

MEANS FOR CONTROLLING A SOLVENT REFINING UNIT

Robert A. Woodle, Nederland, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Oct. 7, 1976, Ser. No. 730,487
Int. Cl.[2] G06G *7/58*; C10G *43/08, 21/00*
U.S. Cl. 364—501 **7 Claims**



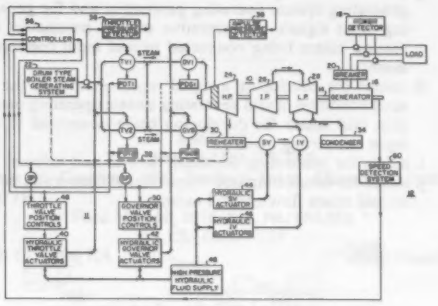
1. A control system for a solvent refining unit which treats charge oil with a solvent in a refining tower to yield raffinate and extract-mix, strippers separate the solvent from the raffinate and extract-mix to provide refined waxy oil and extract oil, respectively, the solvent is returned to the tower and the refined waxy oil is subsequently dewaxed to provide refined oil, comprising temperature sensing means for sensing the temperature of the extract-mix in the refining tower and providing a signal T_P corresponding thereto; charge oil sensing means for sensing the flow rate of the charge oil and providing a corresponding signal CHG_P; extract oil sensing means for sensing the flow rate of the extract oil and providing a signal EO_P representative thereof; solvent sensing means for sensing the flow rate of the solvent and providing a signal S_P corresponding thereto; signal means connected to all the sensing means for providing signals T_D, CHG_D and S_D corresponding to a desired temperature for the extract mix in the refining tower, to a desired flow rate for the charge oil and to a desired flow rate for the solvent in accordance with signals CHG_P and T_P and EO_P so as to operate the refining unit to achieve either a maximum allowable flow rate for the solvent, or a maximum allowable flow rate for the extract oil or a maximum allowable refined oil flow rate or a reduced charge oil flow rate for fixed refined oil flow rate; and control means connected to the signal means for controlling the charge oil flow rate, the refining tower extract mix temperature and the solvent flow rate in accordance with signals CHG_D, S_D and T_D.

4,053,745

VALVE CONTINGENCY DETECTION SYSTEM FOR A TURBINE POWER PLANT

Leaman B. Podolsky, Wilmington, Del., and Charles L. Groves, Jr., Wexford, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 12, 1975, Ser. No. 631,299
Int. Cl.[2] F01B *25/00*
U.S. Cl. 364—494 **11 Claims**



1. A steam turbine system, comprising

a plurality of steam inlet valves for governing the admission of steam to the turbine,

means to generate an electrical representation of a desired valve position for each of the steam inlet valves,

means to control each of the steam inlet valves in accordance with the desired valve position representation,

means to generate an electrical representation of actual valve position for each of the steam inlet valves,

means when activated to generate a contingency output representation for each of the steam inlet valves,

means to compare the representations of actual and desired position for each of the steam inlet valves,

means governed by the compared representation to initiate a predetermined time duration for each valve at times when the actual and desired representations of a respective valve differ by a predetermined value,

means governed by the comparison means to activate the contingency output generating means in response to a compared difference of said predetermined value at the termination of the initiated time duration period for each valve, and

means governed by the activated contingency generating output means for each valve to indicate a contingency for such associated valve.

4,053,746

SYSTEM AND METHOD FOR OPERATING A STEAM TURBINE WITH DIGITAL COMPUTER CONTROL HAVING INTEGRATOR LIMIT

Andrew Braytenbah, Pennsauken, N.J., and Leaman Podolsky, Wilmington, Del., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 247,851, April 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 247,440, April 25, 1972, abandoned, which is a continuation-in-part of Ser. No. 246,900, April 24, 1972, abandoned. This application Oct. 17, 1973, Ser. No. 407,361
Int. Cl.[2] H02P *9/04*; G05B *15/00*; F01D *17/02*
U.S. Cl. 364—494 **26 Claims**

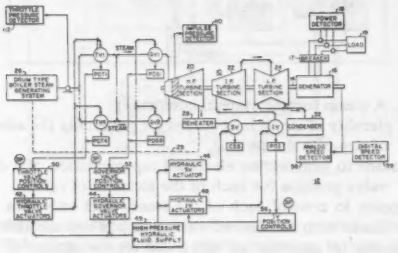
1. An electric power generating system comprising:

a. a steam turbine system;

b. a steam generator for providing steam to said steam turbine system;

c. an electric generator rotated by said turbine system and adapted to be connected to an electric load;

d. means for digitally computing and processing, having a central processor unit and a memory interconnected with said central processor unit;
e. means for converting input signals to digital data, said input converting means being connected to said digital computing means;
f. means for converting digital data to output signals, said digital to output converting means being connected to said digital computing means;
g. means for sensing the value of at least one predetermined generating system operating parameter, and for generating input signals representative of said parameter, said sensing means being connected to said input converting means;
h. means for developing a signal representative of the desired condition of said generating system operating parameter, said means for developing being connected to said input converting means;
i. means for controlling the steam flow to said turbine;
j. means for connecting said output signal converting means to said steam flow control means;



k. said digital computer means being characterized in that it is programmed to perform a plurality of respective functions in accordance with a predetermined priority, said functions including
  i. developing a difference signal representative of the differential between the desired and the present conditions of said generating system operating parameter, and
  ii. translating said difference into control signals for said output converting means, said translating function including integrating the difference signals and limiting the integrated difference signals to a specified range corresponding to extreme conditions of said steam control means, and
l. said control signals being converted to output signals by said output converting means for controlling said steam flow control means as a function of said sensed parameters so as to control steam flow as an intermediate variable, and to control turbine and generator speed and load as end operating variables.

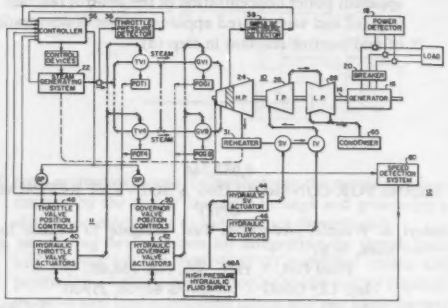
4,053,747

SYSTEM FOR INITIALIZING A BACKUP COMPUTER IN A MULTIPLE COMPUTER ELECTRIC POWER PLANT AND TURBINE CONTROL SYSTEM TO PROVIDE TURBINE AND PLANT OPERATION WITH REDUCED TIME FOR BACKUP COMPUTER AVAILABILITY

Guy E. Davis, Martinez, Calif., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 6, 1973, Ser. No. 413,274
Int. Cl.² F01D *17/02;* **G05B** *15/00;* **G06F** *15/06*
U.S. Cl. 364—494 **50 Claims**

1. A control system for an electric power plant having at least one steam turbine and a steam generator, said control system comprising at least a first digital computer and a second digital computer, means for generating input signals representing predetermined process variables associated with said steam generator, means for generating input signals representing predetermined process variables associated with said steam turbine, means for coupling the input signals to both of said computers, each of said computers having means for controlling its sequential programmed operation and including substantially identical means for generating control outputs for operating controllable elements of said steam generator and throttle and governor valves of said steam turbine as a function of the input signals, means for sensing predetermined control system malfunctions, means for coupling the outputs of one of said computers to operate the steam generator controllable elements and the turbine valves, means for substantially conforming the structure of the other computer to the structure of



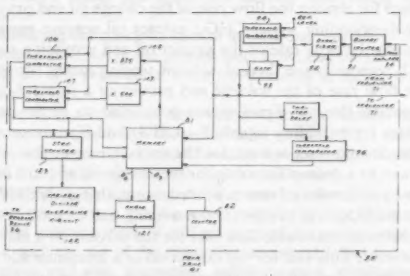
said one computer in real time including means for generating predetermined control outputs in the other computer substantially equal to corresponding ones from said one computer, means for data linking said computers, each of said computers including means for initializing itself after a stoppage including means for transferring the status of predetermined initialization variables over said data link means from one of said computers in control to the other computer being initialized, and means for executing a transfer in the control of the steam generator and the turbine from said one computer to said other computer substantially without disturbing the power generation when said sensing means detects a control system malfunction and after said other computer is initialized.

4,053,748

TECHNIQUES FOR DETERMINING THE PEAK ANGLE OF RESPONSE OF PIEZOELECTRIC CRYSTALS AND OTHER RADIATION-SENSITIVE RESONANT DEVICES

Horst William Kueppers, 126 Brewster Ave., Piscataway, N.J. 08854

Filed Dec. 1, 1975, Ser. No. 636,435
Int. Cl.² G01N *23/20*
U.S. Cl. 364—525 **14 Claims**



1. In a machine-instrumented method of determining the angle of peak amplitude response of a radiation-sensitive resonant device to a beam of radiation incident on a first surface of the device as the relative angle between the incident beam and

the first surface is swept in a first direction, the improvement which comprises the steps of:

scanning the first surface stepwise with the beam of radiation in the first direction;

sampling the amplitude response of the device at the angle attained at the end of each step;

storing successive ones of the measured amplitude samples;

determining the attained angle of scan corresponding to each stored amplitude sample;

determining the value of a first one of the attained angles occurring when the amplitude of the samples has decreased monotonically over a prescribed number of successive steps;

retrieving a first one of the stored samples corresponding to a second one of the attained angles occurring the predetermined number of steps before the first attained angle;

calculating a predetermined amplitude value equal to a prescribed percentage of the retrieved first amplitude sample;

determining the value of a third one of the attained angles occurring when the samples have decreased in amplitude to the predetermined value following the first attained angle;

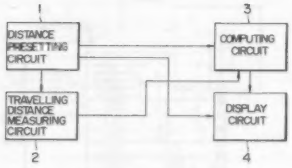
determining the value of a fourth one of the attained angles corresponding to the predetermined value and occurring before the second attained angle; and

averaging the third and fourth attained angles to approximate the angle of peak response of the device.

4,053,749
DISTANCE METER FOR VEHICLE CAPABLE OF DISPLAYING TRAVELLING DISTANCE TO DESTINATION

Yoshio Shinoda, Okazaki, and Akira Kuno, Nagoya, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Mar. 31, 1976, Ser. No. 672,630
Claims priority, application Japan, May 15, 1975, 50-58235
Int. Cl.² G01C *22/02*
U.S. Cl. 364—424 **5 Claims**



1. A distance meter for a vehicle for displaying the remaining distance to a destination, said meter comprising:

distance presetting means for presetting the distance of travel of a vehicle from a starting point to a destination at said starting point and for generating a preset distance signal representative of said preset distance, said distance presetting means including switch means disposed to be opened and closed, the presetting of said preset distance being accomplished in accordance with the number of on-off operations of said switch means;

travelling distance measuring means connected to said distance presetting means for generating a travelling distance signal for every predetermined distance travelled by said vehicle, said travelling distance measuring means including a vehicle speed sensor for detecting the rotational speed of the wheel of said vehicle to generate a vehicle speed pulse signal, and a frequency dividing circuit for frequency dividing said vehicle speed pulse signal to generate said travelling distance signal, said frequency dividing circuit being disposed to be reset in response to the first closing of said switch means during a distance presetting operation;

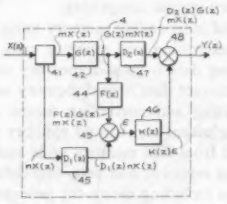
computing means connected to said distance presetting means and said travelling distance measuring means for repeatedly subtracting said predetermined distance travelled by said vehicle from said preset distance represented by said preset distance signal in response to the generation of said travelling distance signals to compute the remaining distance to said destination; and

display means connected to said computing means for displaying the result of said computation by said computing means.

4,053,750
FEEDFORWARD FILTER

James N. Constant, 1603 Danbury Drive, Claremont, Calif. 91711

Filed May 10, 1976, Ser. No. 684,861
Int. Cl.² G06F *7/38*
U.S. Cl. 364—724 **15 Claims**



1. A feedforward filter having a transfer function H(z) comprising:

a signal divider having input signal X(z) and providing at its output signals $MX(z)$ and $nX(z)$, where $m + n = 1$;

a first filter having an arbitrary transfer function G(z),

said output $mX(z)$ from said signal divider being input to said first filter,

said first filter providing at its output the signal $G(z)mX(z)$;

first delay means having transfer function $D_1(z)$,

said output $nX(z)$ from said signal divider being input to said first delay means,

said first delay means providing at its output the signal $D_1(z)nX(z)$;

a second filter having transfer fucntion F(z),

said output $G(z)mX(z)$ from said first filter being input to said second filter,

said second filter providing at its output the signal $F(z)G(z)mX(z)$;

a first mixer having input the signals $F(z)G(z)mX(z)$ from said second filter and $D_1(z)nX(z)$ from said first delay means and providing at its output one of the error signal $\epsilon = F(z)G(z)mX(z) \pm D_1(z)nX(z)$;

a third filter having transfer function K(z),

said output ϵ from said first mixer being input to said third filter,

said third filter providing at its output the signal $K(z)\epsilon$;

second delay means having transfer function $D_2(z)$,

said output $G(z)mX(z)$ from said first filter being input to said second delay means,

said second delay means providing at its output the signal $D_2(z)G(z)mX(z)$; and

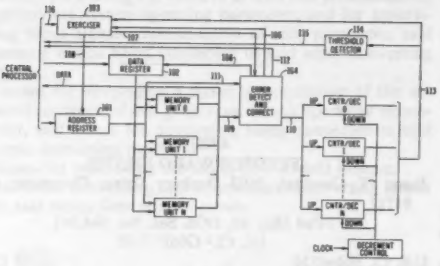
a second mixer having input the signals $D_2(z)G(z)mX(z)$ from said second delay means and $K(z)\epsilon$ from said third filter and providing at its output the signal $Y(z) = H(z)X(z)$,

said output signal Y(z) representing the convolution of said input signal X(z) and said transfer function H(z).

4,053,751
ADAPTABLE EXERCISER FOR A MEMORY SYSTEM

Cyrus Frank Ault, Wheaton, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 28, 1976, Ser. No. 680,988
Int. Cl.[2] G11C *29/00*; G06F *11/10*
U.S. Cl. 235—302.3 7 Claims



1. A memory system comprising:

a plurality of independent memory units;

means for exercising said memory units comprising means for reading data from said memory units and means for placing correct data in said memory units;

error detecting and correcting means connected to said exercising means and to said memory units for receiving data read from said memory units and for detecting and correcting errors in said data, said detecting and correcting means including means for generating error signals;

a plurality of counter means corresponding in number to said plurality of memory units, and individually associated therewith, each of said counter means being incremented by said error signals generated during the exercise of the associated memory unit, and decremented at a predetermined rate with time; and

means connected to said exercising means and to said plurality of counter means and responsive to the contents of said plurality of counter means for controlling said exercising means such that each of said memory units is exercised at an individually selectable rate dependent upon the contents of its associated counter means.

4,053,752
ERROR RECOVERY AND CONTROL IN A MASS STORAGE SYSTEM

Patrick Fred DeJohn, Dallas, Tex.; Charles Edwin Hoff, Longmont, Colo.; Robert Douglas Tennison, Boulder, Colo., and James Clair Young, Jr., Broomfield, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,592
Int. Cl.[2] G11C *29/00*; G06F *11/04*
U.S. Cl. 235—302.1 11 Claims

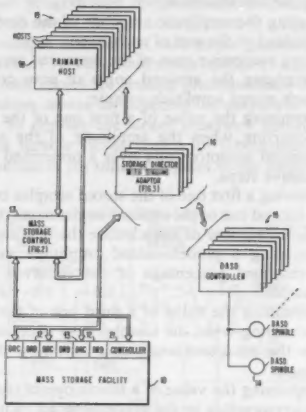
1. The method of error control for a storage apparatus having a plurality of storage levels,

including the steps of:

detecting a predetermined number of errors in a given portion of an upper one of said storage levels during a data movement to a lower storage level;

indicating data signals stored in said lower storage level associatable with said given portion as signals having data errors;

moving said data signals in error irrespective of said errors from said upper storage level to said lower storage level associatable with said upper storage level; and

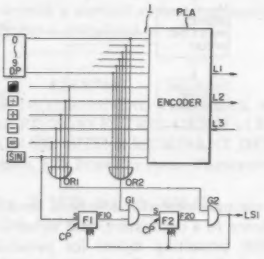


maintaining said data signals in said upper storage level and inhibiting data access to said given portion of said upper storage level for preserving same for diagnostic analysis.

4,053,753
ELECTRONIC CALCULATOR WITH FUNCTION KEYS

Ichiro Sado; Juji Kishimoto, both of Tokyo; Seiji Saito, Yokohama, and Atsushi Sakurai, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 19, 1976, Ser. No. 668,803
Claims priority, application Japan, Mar. 28, 1975, 50-37498; Feb. 24, 1976, 51-19133
Int. Cl.[2] G06F *7/38*
U.S. Cl. 364—709 4 Claims



1. An electronic calculator comprising:

a plurality of numeric keys operative to enter signals corresponding to selected numerical data;

a plurality of operation keys operative to enter signals corresponding to selected arithmetic operations;

at least one function key operative to select a predetermined computation to be performed on data entered by said numeric keys;

a result key operative to instruct computation of expressions entered by selective actuation of said numeric, said operation and said function keys;

input control means coupled to each of said numeric keys, said operation keys, said at least one function key and said result key, for producing control signals in response to actuation of corresponding ones of said keys, said control means comprising a first memory means operative to store a first control signal produced in response to actuation of said at least one function key, a second memory means

coupled to the first memory means and operative to store a second control signal produced in response to actuation of a selected one of said numeric keys only when said first control signal is stored in said first memory means, and signal generating means coupled to said second memory means for producing a command signal operative to enable said predetermined computation in response to actuation of either one of said operation keys and said result key only when said second control signal is stored in said second memory element wherein said command signal is generated only if said numeric keys are actuated next following an actuation of said at least one function key; and

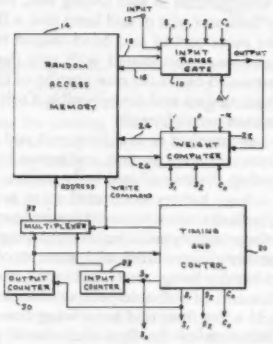
arithmetic operation means coupled to said input control means for performing said predetermined computation and for producing a corresponding display output signal in response to the command signal from said input control means.

4,053,754

RECURSIVE PROCESSING OF MULTIPLE INTENSITY-MODULATED SCANS

Robert D. Berlin, Syracuse, and Jack B. Williams, Liverpool, both of N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed June 23, 1976, Ser. No. 698,988
Int. Cl.² G06F *7/38*
U.S. Cl. 364—723 **5 Claims**



1. A recursive signal processing apparatus comprising in combination:

a range determining means receiving an input signal, said input signal being scanned by said range determining means at a predetermined rate, said range determining means displaying a range scan, said range scan including said input signal and a synch pulse, said range scan being repetitive, said input signal containing at least one data pulse therein, said range determining means providing a range signal and a range gate output,

a computing means receiving said range gate output from said range determining means, said computing means computing a weighting factor for each input signal, said computing means comparing said range gate output with said weighting factor, said computing means providing a weight data output,

a memory means receiving said range signal from said range determining means, said memory means storing said range signal to provide a stored range signal to said range determining means, said range determining means comparing said input signal with said stored range signal to provide said range gate output, said memory means receiving said weight data output from said computing means, said memory means storing said weight data output to provide a stored data weight to said computing means, said computing means computes $(1 - n\alpha)$ times the stored data weight and retains this weight for the present input signal if the new product is greater than previously stored weights, and,

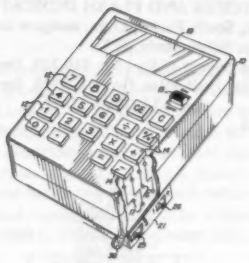
a control means to provide strobe and control signals to said range determining means and said computing means, said control means being connected to said memory means to control the acquisition of said range signal and said weight data output, said control means controlling the transmission of said stored range signal to said ranging determining means and said stored data weight to said computing means, said control means controlling the comparison operation within said range determining means and the multiplication and comparison process within said computing means.

4,053,755

PEDOMETER DISTANCE-MEASURING DEVICE

John C. Sherrill, 547 W. Southern Hills Road, Phoenix, Ariz. 85023

Filed Aug. 16, 1976, Ser. No. 714,768
Int. Cl.² G01C *22/00*; G06F *15/02*
U.S. Cl. 364—561 **8 Claims**



1. A pedometer device to be carried on the person of the user including in combination:

electronic calculator means programmable by the user for entering predetermined data in response to input pulses;

stride actuated switch means operated in response to steps taken by the user indicative of units of distance; and

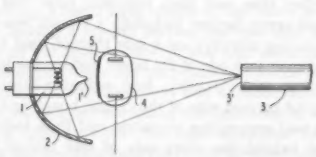
pulse supply means controlled by said stride actuated switch means for producing input pulses in response to the operation of said switch means and connected with said electronic calculator means for supplying said input pulses thereto indicative of units of distance covered.

4,053,756

ILLUMINATION LIGHT-SOURCE DEVICE FOR AN ENDOSCOPE OR THE LIKE

Nagashige Takahashi, No. 4-1, Nishi, Kokubunji, Tokyo, Japan

Filed Dec. 23, 1975, Ser. No. 644,781
Claims priority, application Japan, Dec. 26, 1974, 50-3926[U]
Int. Cl.² A61B *1/06*
U.S. Cl. 362—7 **3 Claims**



1. A light source for an endoscope or the like for producing viewing light and photographing light and for directing said

light to a light incident surface of a light guide, said light source comprising,

A first lamp for producing conventional viewing illumination, said lamp having a sealed tip portion pointing in the light path direction towards the said light incident surface,

a curved mirror positioned in back of said first lamp for condensing the light from said first lamp onto said light incident surface,

a flash discharge tube having a pair of electrodes and a housing, a reflective coating on a semicircular portion of said housing to condense the light from said flash discharge tube,

said flash discharge tube being positioned to place the outer surface of said reflective coating just in front of said tip to provide minimum interference with said condensed light from said curved mirror and to direct said condensed flash light from the internal surface of said coated reflector onto said light incident surface.

4,053,757

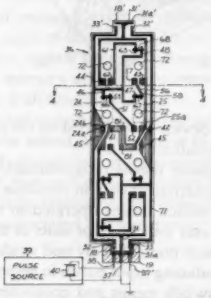
PHOTOFLASH LAMP ARRAY HAVING RADIATION SWITCHES AND FLASH INDICATORS

Richard Blount, South Euclid, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 510,323, Sept. 30, 1974, abandoned. This application Dec. 11, 1975, Ser. No. 639,794

Int. Cl.[2] G03B *15/02*

U.S. Cl. 362—4 **8 Claims**



1. A flash lamp array comprising a plurality of flash lamps and sequencing circuitry for sequentially flashing said lamps, said array being provided with connector means for receiving lamp-firing electrical signals, each of said flash lamps comprising a tubular-like envelope having an end thereof generally facing toward said connector means, said sequencing circuitry comprising a radiation-actuated switch, said array being provided with a flash indicator comprising a radiation-sensitive material, said switch and said flash indicator being located adjacent to the side of said flash lamp with said switch relatively farther than said flash indicator from said connector means, said array further including a circuit board carrying said sequencing circuitry on a side thereof, said lamps being positioned over said side of the board and having lead-in wires connected to said circuitry, said radiation-actuated switch being carried on said side of the circuit board and being connected in said sequencing circuitry, said flash indicator being positioned behind the other side of said circuit board, and window means through said circuit board for permitting radiant energy from said lamp when flashed to impinge upon said flash indicator.

4,053,758

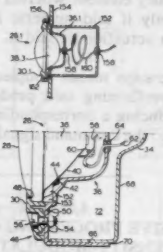
UNDERWATER SWIMMING POOL ILLUMINATION SYSTEMS

Frank D. Shaw, Etobicoke, Canada, assignor to Swan Recreational Products Limited, Toronto, Canada

Continuation of Ser. No. 477,003, June 6, 1974, Pat. No. 3,955,076. This application Mar. 29, 1976, Ser. No. 671,353

Int. Cl.[2] F21V *31/00*

U.S. Cl. 362—158 **3 Claims**



1. For use in underwater swimming pool illumination, an underwater lighting assembly comprising:

a waterproof lamp enclosure having a generally bowl-shaped body portion adapted to receive the rear portion of a conically-shaped lamp unit, an O-ring seat formed around the outer part of said body portion and a compressible O-ring fitted in said O-ring seat, retainer means to fit over the outer part of said lamp unit, a flange formed around the outer part of said bowl-shaped body portion, and fastener means associated with said flange and said retainer means to cause the rear portion of said lamp unit to be forced against said compressible O-ring when said fastener means are tightened;

electrical wires attached to said lamp unit and passing rearwardly from said body portion, and means for exteriorally waterproofing the rear of said body portion;

and a low-voltage battery connected so as to provide low voltage, ripple-free direct current power to said lamp unit;

said low-voltage battery and a battery charging circuit being each remotely situated from said waterproof lamp enclosure, said battery being connected to the first and second switch elements of a double-pole, double-throw switch;

said electrical wires from said lamp being connected to first contact elements of the first and second poles of said double-pole, double-throw switch; and the output of said battery charging circuit being connected to second contact elements of the first and second poles of said double-pole, double-throw switch;

so that when said switch is in its first pole position, said battery is electrically connected to said lamp and not to said battery charging circuit;

and when said switch is in its second pole position, said battery is electrically connected to said battery charging circuit and not to said lamp.

4,053,759

LAMPHOUSE AND MODULE FOR PHOTOGRAPHIC SLIDE PROJECTORS

John Nicholas Wilkinson, Duarte, Calif., assignor to Optical Radiation Corporation, Azusa, Calif.

Continuation of Ser. No. 335,018, April 27, 1973, abandoned. This application Nov. 4, 1975, Ser. No. 628,482

Int. Cl.[2] F21V *29/00*

U.S. Cl. 362—218 **5 Claims**

1. A high-intensity lamp module, comprising:

an elongated high-intensity lamp having a central illumination portion and a pair of oppositely-disposed terminal portions thereon;

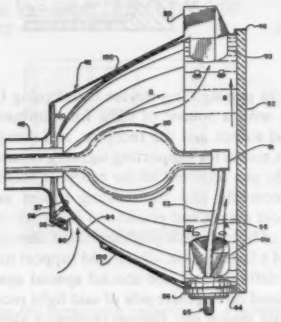
a housing surrounding said lamp, said housing having two

opposed ends, one of which includes means for mounting said elongated lamp by one of said terminal portions and the other of which includes means for mounting a light-transmitting window;

a light-transmitting window mounted in said other end of said housing;

a reflector mounted within said housing for reflecting light from said high-intensity lamp out of said housing through said light-transmitting window, said reflector surrounding said lamp but being spaced therefrom to permit cooling fluid within said housing to pass between said lamp and said reflector;

a first opening in said housing adjacent the inner face of said light-transmitting window and serving as a port of egress for cooling fluid introduced into said housing;



a second opening in said housing adjacent the inner face of said light-transmitting window at a position substantially opposite to that of said first opening and serving as a port of ingress for cooling fluid introduced into said housing, the flow of cooling fluid from said second opening to said first opening being substantially adjacent such inner face of said window and including the adjacent one of said lamp terminal portions; and

a third opening in said housing substantially adjacent the end of said housing serving as a mounting means for said lamp, the flow of cooling fluid from said third opening to said first opening passing between said reflector and said lamp in direct contact with the latter;

whereby two separate and distinct paths of flow are provided for cooling fluid introduced into said housing, the two paths becoming one at the point of egress at said first opening in said housing.

4,053,760

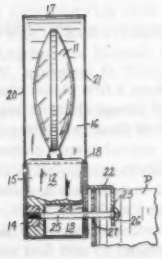
WARNING LIGHT GUARD

Charles A. Glazier, 445 Orange Ave., West Haven, Conn. 06516

Filed May 10, 1976, Ser. No. 684,549

Int. Cl.² F21V *15/00*

U.S. Cl. 362—186 **5 Claims**



1. A warning light guard comprising, a rectangular base portion adapted to enclose laterally the battery housing portion of a warning light, an upper portion fixed on the base and including a solid metal band fitting freely around the lamp portion of the light and a strong substantially flat metal grid covering the space between the upper edges of the base portion and the edges of said band, and a mounting bracket fixed on the base portion, for attachment of the guard to a support.

4,053,761

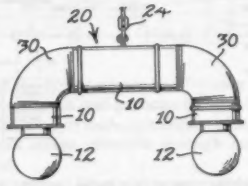
DECORATIVE ITEM

Jerry A. Brinkley, 1416 First Ave. , NE., Winchester, Tenn. 37398

Filed Mar. 18, 1976, Ser. No. 668,201

Int. Cl.² F21S *13/10, 1/02*

U.S. Cl. 362—413 **2 Claims**



2. A decorative electric lamp comprising a plurality of sections of stovepipe joined together in an ornamental configuration such as a C-shape, T-shape, V-shape, fire hydrant shape or the like with electric light bulbs on the ends thereof adapted to light up when electricity is turned on, said stovepipe sections being snugly joined together in such a manner so as to allow the sections to be twisted relative to each other when joined to form the desired configuration and to normally retain said configuration until it is desired to change said configuration.

4,053,762

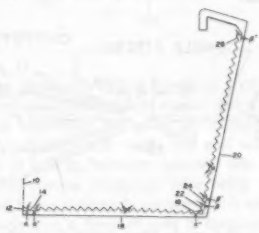
TWIN-BEAM LUMINAIRE LENS

Grafton K. Barbson, Quarryville, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Dec. 29, 1975, Ser. No. 644,753

Int. Cl.² F21V *5/00*

U.S. Cl. 362—223 **4 Claims**



1. An elongated luminaire for illuminating an area therebelow comprising a linear light source of two tubes and an elongated lens having a bottom section and two side sections on either side of the bottom section, said side sections being inclined at an angle from a line perpendicular to the plane of the bottom section of the luminaire, said sections having prisms formed on the side thereof facing the light source, said prisms constituting light incident and light emergent surfaces for redirecting and emitting light rays from the light source generally away from the vertical plane through and parallel to the axis of said linear light source and into annular ranges on either side thereof with substantially half of the light distributed in an

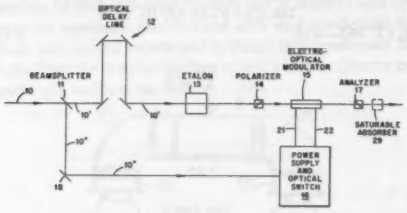
area from 0° to 30° on each side of the vertical plane, and substantially the other half of the light distributed in an area from 30° to 60° on each side of the vertical plane.

4,053,763

METHOD AND APPARATUS FOR PULSE STACKING

Robert C. Harney, Livermore, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 25, 1976, Ser. No. 689,751
Int. Cl.[2] H01J *39/12*; G02B *27/10*; G02F *1/01, 1/03*
U.S. Cl. 250—206 28 Claims



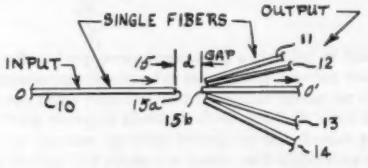
1. A pulse stacking system in a pulse-forming network capable of forming and summing a sequence of time-delayed waveforms arising from a single light pulse comprising: an etalon, an electro-optical modulator positioned in aligned spaced relationship with said etalon, power supply and optical switch means operably connected to said modulator, means for polarizing a light pulse being directed into said modulator, analyzer means aligned to receive an output pulse from said modulator, said analyzer means being of a differing polarization direction with respect to said polarizing means, and pulse directing means for directing portions of an incoming pulse into said etalon and into said power supply and optical switch means.

4,053,764

HIGHER-ORDER MODE FIBER OPTICS T-COUPLER

Paul F. Sierak, Utica, and Allen E. Clough, Rome, both of N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 2, 1975, Ser. No. 619,111
Int. Cl.[2] G02B *5/14*; H01J *5/16, 39/12*
U.S. Cl. 250—227 2 Claims



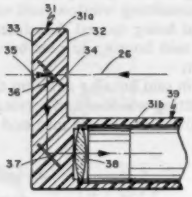
1. A higher order mode fiber optic T-coupler being comprised of a single main optical fiber having first and second ends and a predetermined axis, said first end receiving a first input optical light signal for transmission toward said second end, said single main optical fiber having exclusively an air gap therein, said gap being defined by a first and second separated endfaces in said single main optical fiber, and a first multiplicity of exclusively single fiber optical channels positioned at said second endface of said gap, each of said single optical channels being at a different angle to said single main optical fiber, each of said angular optical channels consisting of a single optical fiber, the variation of distance of said gap and the adjustment of said angle determining the degree of coupling of said higher modes into said optical channels.

4,053,765

PARALLAX FREE LIGHT PEN

Fernand Bannie Kuffer, Brea, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Filed Sept. 27, 1976, Ser. No. 727,312
Int. Cl.[2] G02B *5/14*
U.S. Cl. 250—227 18 Claims



1. A light pen sighting device for aligning the receptor of a light pen with a source of light for eliminating parallax between said source and the receptor, and comprising:

support means for supporting sighting means on the barrel of a light pen adjacent to the receptor thereof,

light receiving and transmitting means mounted by said support means and positioned for receiving and directing rays of light from a predetermined direction to the receptor of a light pen on which said support means is mounted,

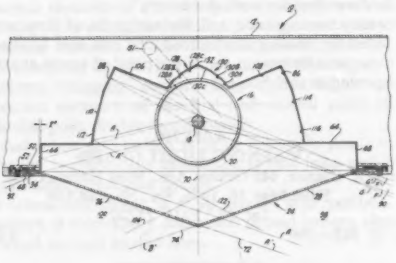
means defining first and second spaced apart reticle means disposed on opposite side of said light receiving and transmitting means and aligned therewith along an axis corresponding to said predetermined direction for directing light from said predetermined direction without parallax to the receptor to which said support means is mounted.

4,053,766

LAMP LENS STRUCTURE

John R. Brass, San Rafael, Calif., assignor to U.S. Industries, Inc., New York, N.Y.

Filed Dec. 23, 1975, Ser. No. 643,930
Int. Cl.[2] F21V *13/04*
U.S. Cl. 362—301 23 Claims



1. A device for projecting light to illuminate an area comprising:

a. light source;

b. lens having at least a first planar element, a second planar element, a third planar element, and a fourth planar element and said first planar element angularly oriented with respect to said second planar element and said third and fourth planar elements angularly oriented with respect to each other and to said first and second planar elements forming a pyramidal shaped lens;

c. first reflector oriented to reflect light from said source substantially parallel to said first planar element, a definable portion of the reflected light passing below said source and through said second planar element in a first

maximum candle power plane from said device to the area to be illuminated;

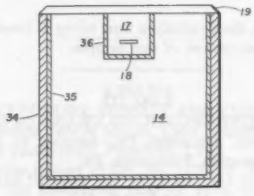
d. second reflector oriented to reflect light from said source substantially parallel to said second planar element, a definable portion of the reflected light passing below said source and through said first planar lens element in a second maximum candle power plane from said device to the area to be illuminated.

4,053,767

METHOD AND APPARATUS FOR STABILIZING SIGNALS IN RADIOACTIVE WELL LOGGING TOOLS

John G. Kampfer, and Lucian A. Ingram, both of Houston, Tex., assignors to Halliburton Company, Duncan, Okla.

Filed Aug. 23, 1976, Ser. No. 716,905
Int. Cl.[2] G01D *18/00*; G01V *5/00*
U.S. Cl. 250—252 **20 Claims**



1. An apparatus for measuring radiation in a borehole comprising:

a main scintillation crystal capable of scintillating responsive to the radiation to be measured for giving off a first set of light flashes whose intensity is proportional to the intensity of said radiation;

a reference scintillation crystal embedded in one end of said main crystal, said reference scintillation crystal having a source of mono-energetic radiation embedded therein for inducing in said reference scintillation crystal a second set of light flashes of a predetermined intensity;

light transmitting means adjacent said one end of said main scintillation crystal arranged for transmitting said first set of light flashes directly from said main scintillation crystal and for transmitting said second set of light flashes directly from said reference scintillation crystal;

light sensing means optically coupled to said light transmitting means for generating electrical pulses responsive to the light flashes of said first and second set of light flashes, wherein the height of each of said generated electrical pulses is proportional to the intensity of a respective light flash of said first and second set of light flashes; and

electrical data transmitting means electrically connected to said light sensing means for transmitting said electrical pulses to a point removed from said borehole.

4,053,768

METHOD AND APPARATUS FOR IMPROVING CONTRAST IN ELECTROPHORETIC DISPLAY

John H. Lewis, Los Angeles, and Michael D. McDiarmid, Van Nuys, both of Calif., assignors to Xonics, Inc., Van Nuys, Calif.

Filed Sept. 10, 1976, Ser. No. 722,276
Int. Cl.[2] G03B *41/16*
U.S. Cl. 250—315 A **15 Claims**

1. In an electronradiography imaging chamber for providing a visual image, the combination of:

first and second electrodes;

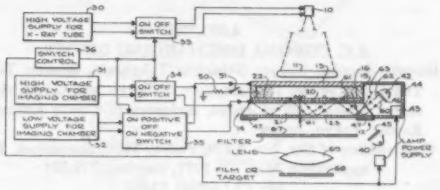
means for supporting said electrodes in spaced relation with a gap therebetween;

an X-ray absorber and electron and positive ion emitter in said gap, with X-ray radiation entering said gap being absorbed and providing electrons and positive ions in said gap;

a plurality of electrophoretic particles dispersed in a liquid in said gap;

a dye dispersed in said liquid, said dispersed dye having a color absorption spectrum;

means for connecting an electrical potential across said electrodes for attracting electrons toward one electrode and positive ions toward the other depending upon the



polarity of the power source and forming an electrostatic charge image, with said particles being selectively deposited as a function of said electrostatic charge image forming a visual image viewable through one of said electrodes; and

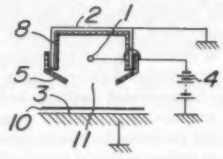
means for directing illumination onto deposited particles, with said illumination having a color emission spectrum substantially corresponding to said dye absorption spectrum.

4,053,769

CORONA CHARGE DEVICE

Masaji Nishikawa, and Muneo Kasuga, both of Hachioji, Japan, assignors to Olympus Optical Company Limited, Tokyo, Japan

Filed Mar. 9, 1976, Ser. No. 665,315
Claims priority, application Japan, Mar. 15, 1975, 50-31578
Int. Cl.[2] G03G *15/00*
U.S. Cl. 250—324 **2 Claims**



1. A corona charge device comprising a corona discharge wire connected to a high voltage source and a grounded conductive shield electrode including an elongate rectangular closed vessel including side walls and end walls, said vessel being open at its bottom between opposed side walls to define an opening, the corona discharge wire being surrounded by said vessel and being resiliently supported by said end walls of said vessel such that a flow of ions is directed downwardly from said corona discharge wire through said opening toward a field electrode, said device further comprising means for controlling the flow of ions toward said field electrode including elongate insulating plates each having upper and lower half portions, said upper half portions being respectively secured to and extending along each side wall of said conductive shield electrode and said lower half portion being inclined at an angle with respect to said upper half portion to reduce the transverse width of said opening, means for maintaining said insulating plates at an electric potential which is higher than the electric potential of said grounded conductive shield electrode and means for setting an electrical potential of at least the inner surface of said shield electrode to an electrical potential between the electrical potential applied from said high voltage

source to said corona discharge wire and ground electrical potential.

4,053,770

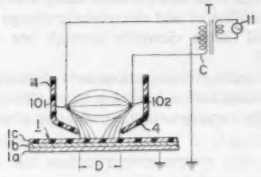
A.C. CORONA DISCHARGING DEVICE

Hiroshi Tanaka, Tokyo; Shinkichi Takahashi, Kinata; Touru Takahashi; Shusei Tsukada, both of Tokyo, and Giichi Marushima, Komae, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 8,270, Feb. 3, 1970, abandoned. This application Mar. 21, 1977, Ser. No. 779,581

Int. Cl.[2] G03G *15/00*

U.S. Cl. 250—324 8 Claims



1. An A.C. corona discharging system for applying a corona discharge to a photoconductive member having a conductive backing, and for contemporaneously projecting an optical image upon the member, comprising in combination: means for connecting the conductive backing of the member to a point of reference potential; an electrode, and means for supporting said electrode at a position spaced from said photoconductive member on the side remote from said backing, wherein said electrode and said photoconductive member are relatively movable for scanning the surface of the latter; means for connecting a source of alternating current voltage between said point of reference potential and said electrode for establishing a corona discharge between said electrode and said photoconductive member; and insulating material supported at a position spaced from said photoconductive member and surrounding said electrode to define an optical path for the projection of said image therethrough upon said photoconductive member, wherein said material is disposed to become oppositely charged during alternate half cycles of said source voltage for enhancing the corona discharge.

4,053,771

METHOD AND DEVICE FOR ACTIVATION ANALYSIS

Georges Aude, Meylan, and Jean Laverlochére, La Tronche, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

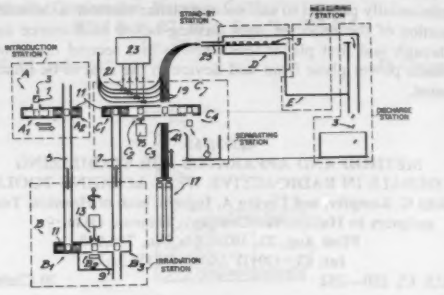
Filed Dec. 1, 1975, Ser. No. 636,631

Claims priority, application France, Dec. 6, 1974, 74.40122

Int. Cl.[2] G01T *1/00*

U.S. Cl. 250—328 10 Claims

1. A method of activation analysis of N samples, wherein the N samples are irradiated simultaneously and wherein said N samples are each measured in turn after having been separated



from each other, the irradiation time being N times longer than the time of measurement of one sample.

4,053,772

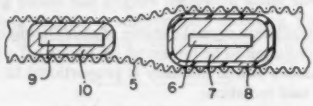
LOCATING UNDERGROUND URANIUM DEPOSITS

Patrick E. Felice, Jeannette, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 30, 1976, Ser. No. 701,432

Int. Cl.[2] G01T *1/11*

U.S. Cl. 250—337 31 Claims



1. A method of locating underground deposits of uranium comprising

A. placing underground a dosimeter in the form of a thin layer about 5 to about 18 mg/cm^2 thick which is capable of storing energy from alpha particles:

B. activating said dosimeter to cause it to release said stored energy from alpha particles; and

C. measuring the amount of energy released.

4,053,773

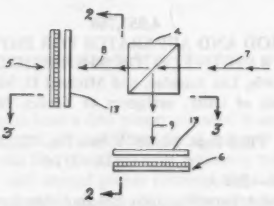
MOSAIC INFRARED SENSOR

Bruce A. Deresh, Dewitt, and Robert J. Chevako, Fabius, both of N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 23, 1976, Ser. No. 669,542

Int. Cl.[2] H01J *39/12;* H01L *27/14*

U.S. Cl. 250—349 1 Claim



1. A mosaic infrared sensor comprising:

a. first and second arrays of *m* spaced, juxtaposed columns of *n* discrete, contiguous infrared detector elements, the infrared detector columns of said first array having widths substantially equal to the spacings between the infrared

detector columns of said second array and the infrared detector columns of said second array having widths substantially equal to the spacings between the infrared detector columns of said first array, the infrared detector columns of each array being aligned with the intercolumn spacings of the other array;

b. beam splitting means adapted to divide received infrared energy into first and second substantially equal sources of infrared energy, said first array being in intercepting relationship with said first source of infrared energy and said second array being in intercepting relationship with said second source of infrared energy, and

c. an optical concentrator means disposed between said beam splitting means and each array of infrared detector element columns, each said optical concentrator means being adapted to focus infrared energy from said beam splitting means onto the infrared detector element columns.

4,053,774

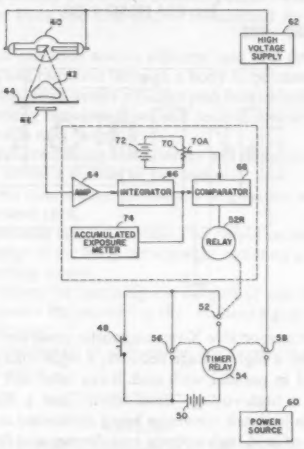
X-RAY EXPOSURE SENSOR AND CONTROLLER

C. Martin Berdahl, Sierra Madre, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Continuation-in-part of Ser. No. 603,109, Aug. 8, 1975, abandoned. This application June 11, 1976, Ser. No. 695,175

Int. Cl.[2] G01J *1/42*

U.S. Cl. 250—355 **18 Claims**



1. In a system wherein an x-ray tube directs x-rays at one side of an object and a photographic film is positioned at the other side of said object, and means are provided for sensing the x-rays passing through said object and film for controlling the dose of x-ray exposure, the improvement in said means comprising

scintillation means for generating photons in response to received x-rays which have passed through said film, and for enabling received x-rays to pass therethrough, said scintillation means being positioned to cover an area of said film where optimal exposure is desired,

voltage generating means positioned adjacent to said scintillation means for generating a voltage responsive to the photons generated and x-rays passing therethrough,

means for integrating the voltage generated by said voltage generating means to produce an integrated voltage, and

means responsive to said integrated voltage reaching a predetermined value for inactivating said x-ray tube.

4,053,775

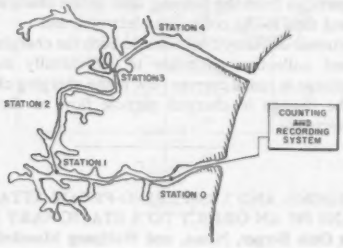
CONSTANT FLOW RADON GAS MONITOR

John C. Franklin, and Thomas O. Meyer, both of Spokane, Wash., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jan. 29, 1976, Ser. No. 653,314

Int. Cl.[2] G01T *1/20*; G01N *21/24*

U.S. Cl. 250—364 **8 Claims**



1. A system for continuously monitoring the concentration of radon gas in air comprising:

detector means for continuously detecting the concentration of radon gas through alpha particle monitoring and outputting electric pulses representative thereof;

pump means to continuously force ambient gas through said detector means at a predetermined flow rate;

filter means for filtering out moisture, particulate matter and radon daughters from the ambient gas before it passes to said detector means; and

counting and recording means operatively connected to said detector for continuous electronically counting the number of respresentative alpha particles pulses detected and recording the number counted.

4,053,776

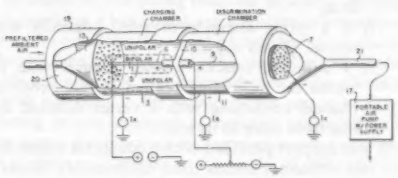
SUB-MICRON PARTICLE DETECTOR

Martin Hertzberg; Charles D. Litton, both of Pittsburgh, and Randall Garloff, Monroeville, all of Pa., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed May 25, 1976, Ser. No. 689,757

Int. Cl.[2] G01T *1/185*

U.S. Cl. 250—382 **10 Claims**



1. A submicron particle detector comprising:

a gas tight housing having a gas inlet and outlet with a submicron charging chamber and collection electrode enclosed therein;

the charging chamber having an inner and an outer generally cylindrical shaped electrode spaced from each other and concentrically arranged with respect to each other;

said inner electrode being associated with a radioactive material, separate means for limiting the normal transmission distance of emitted radioactive particles to the volume immediately around said inner electrode to thereby cause in conjunction with the chamber's electrodes the formation of a small symmetrical bipolar region of pri-

mary ionization with a high intensity electric field thereat and also a larger unipolar charging region of lower electrical intensity between said primary ionization region and the outer electrode of the chamber;

the collection electrode being near said charging chamber and in gaseous communication to receive charged submicron particles after they past through the chamber;

pump means for moving the gas containing the submicron particles from the housing inlet to the charging chamber and then to the collection electrode; and

electronic circuitry connected to both the charging chamber and collection electrode to individually measure the change in radial current flow in the charging chamber and the change in charged particle flow at the collection electrode.

4,053,777

ACCIDENT- AND TAMPERING-PROOF ATTACHMENT MEANS OF AN OBJECT TO A STATIONARY SUPPORT

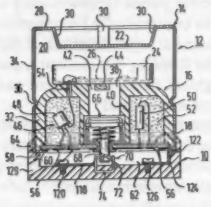
Heinz Otto Berger, Neuss, and Wolfgang Munstedt, Cologne, both of Germany, assignors to GEBA, Gesellschaft fuer elektronische Brandmeldeanlagen mbH & Co., Neuss, Germany

Filed Sept. 15, 1976, Ser. No. 723,337

Claims priority, application Germany, July 7, 1976, 2630572; July 7, 1976, 7621503

Int. Cl.² G01T *1/18*

U.S. Cl. 250—380 **5 Claims**



1. A shock-, vibrations-, and tampering-proof attachment means of an object, such as a signal producing insert of an ionization alarm system coaxially along a common central axis to a fixed support face of a support, such as of land-, marine- and air-vehicles,

A. said object comprising:

A 1. an elongated protrusion mounted nonrotatably and coaxially in the bottom of said object and protruding through its bottom downwardly facing said support face;

A 2. a spring assembly mounted coaxially within the bottom of said object;

A 3. a helical crescent shaped channel with openings within the protruding bottom of said protrusion said channel continuing with a vertex directed upwardly and from there to its end;

B. said support provided with a connector means for a rod, said connector means fixed nonrotatably coaxially with said protrusion; said connector means protruding upwardly from said support;

C. a rod mounted between the said connector means and reaching into said protrusion to engage said channel in a direction substantially radial to the common axis to permit assembly of said object with said support by rotation of the former relative to the latter, to prevent their separation by accident or design.

said spring assembly comprising an axial helical spring and an upper stop, the protrusion being provided with a head, being mounted within said spring and pushed by it upwardly with the head against the stop away from the connecting element;

the axial distance of the path between the openings within the protruding bottom of said protrusion from the vertex being greater than that from the vertex to the end of said channel;

the axial distance between the point of engagement of said rod with said channel or point of catch of the connecting element held in the support, and the stop being smaller than the distance between the free end of the protrusion and the stop in the protrusion of abutment of the protrusion against the stop;

the spring assembly being provided on its inner side with at least one indentation extending inwardly in deviation from a circular cross-section, and extending along at least part of the axial height of the spring assembly, and that the head being provided with milled grooves, corresponding to said at least one indentation.

4,053,778

TRANSPORTABLE X-RAY DIAGNOSTIC APPARATUS

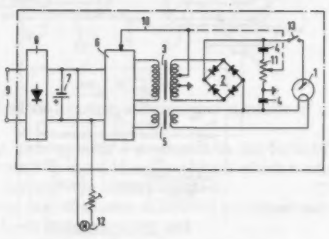
Kurt Franke, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 20, 1975, Ser. No. 624,167

Claims priority, application Germany, Oct. 23, 1974, 2450388

Int. Cl.² H05G *1/00*

U.S. Cl. 250—402 **1 Claim**



1. In a transportable X-ray diagnostic generator including an X-ray tube; a high-voltage rectifier; a high-voltage condenser connected in parallel with said X-ray tube and high-voltage rectifier; a high-voltage transformer; and a filament transformer; an inverted converter being connected to the primary windings of said high-voltage transformer and filament transformer for charging said high-voltage condenser and supplying said filament transformer; and storage cell means being connected to the input of said inverted converter; the energy for an X-ray exposure being stored partially in said storage cell means and partially in said high-voltage condenser; said generator further including charging apparatus connected to said storage cell means and having inputs connected to a terminal plug arrangement; said converter having an output voltage of a frequency higher than the frequency of the power supply, the output frequency of said converter being between 1,000 and 2,000 Hz; means for adjusting the output voltage of said converter and comprising a variable resistor, said high voltage condenser comprising two condenser elements, said variable resistor being connected between said two condenser elements, a mobile carriage mounting the generator components; and a motor connected to said storage cell means for driving said mobile carriage, said storage cell means storing partially the energy for an X-ray exposure and providing energy for driving said carriage by said motor.

4,053,779

METHOD AND APPARATUS FOR CONSTRUCTING MODELS OF BODY SECTIONS

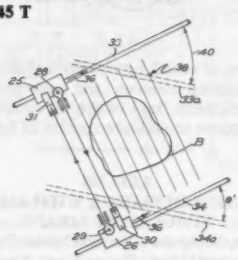
Marcello Barbieri, Fulbourn, England, assignor to Robert MacMillan, Manomet, Mass.; Nicholas Della Grotta, Johnston and Guerino D. Della Grotta, Warwick, both of, R.I., part interest to each

Filed May 9, 1975, Ser. No. 576,109

Claims priority, application United Kingdom, May 10, 1974, 20723/74; Nov. 8, 1974, 48378/74

Int. Cl.[2] G03B *41/16*

U.S. Cl. 250—445 T 1 Claim



1. Apparatus for examining a body using radiation having a wavelength between 0.1A and 159A, comprising:

A. a first source of radiation disposed to transmit radiation through a body and a first detecting means for detecting radiation from said first source transmitted through said body,

B. a second radiation source adjacent said first detector for transmitting radiation through a body to be examined and second detecting means adjacent said first radiation source for detecting radiation from said second source transmitted through said body,

C. means for translating said sources and detectors simultaneously across a section of the body,

D. means for controlling the sources to generate a plurality of successive rays,

E. each detecting means generating an output corresponding to the image of the body between the radiation source and the detecting means,

E. circuit means for summing the outputs of said detectors,

F. circuit means for processing the resultant signal to obtain an output, and

G. means responsive to said output for producing a visual representation.

4,053,780

METHOD FOR CALIBRATION OF AN AXIAL TOMOGRAPHIC SCANNER

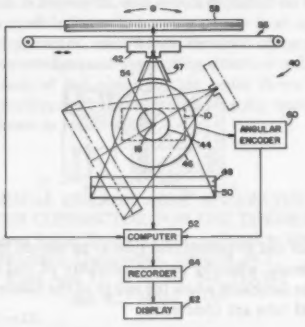
Robert A. Sparks, Palo Alto, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Oct. 20, 1975, Ser. No. 623,861

Int. Cl.[2] G01N *23/00*

U.S. Cl. 250—445 T 15 Claims

1. A method of calibrating an axial tomographic scanner including frame means having an opening therein for receiving an object to be examined, a source of penetrating radiation and detector means mounted on the frame means for directing one or more beams of penetrating radiation from the source to the detector means, means to rotate the frame means including the source and the detector means mounted thereon about the opening and means to translate the source and the detector means laterally across the opening between successive rotations of the frame means by the rotation means; said method comprising positioning a centering member coincident with the center of rotation of the frame means for a first angular orientation thereof; rotating the frame means about the opening and the positioned centering member therein and translating the source and detector means laterally across the opening; and determining for each of a plurality of different angular



orientations of frame means the central position of each translational scan relative to centered member.

4,053,781

PACKING MEMBER FOR RADIOGRAPHIC POSITIONING MEANS

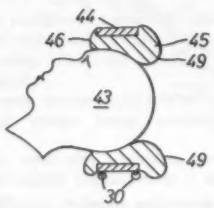
Godfrey Newbold Hounsfield, Newark, England, assignor to E M I Limited, Hayes, England

Filed Dec. 24, 1975, Ser. No. 644,160

Claims priority, application United Kingdom, Jan. 16, 1975, 1880/75

Int. Cl.[2] A61B *6/02, 6/04*

U.S. Cl. 250—456 10 Claims



1. Radiographic apparatus for examining part of the interior of body by means of penetrating radiation including a packing member comprising a bag containing a mixture of emulsifying ointment with a cellulosic filler, said mixture having an absorption to the radiation similar to that of human tissue, the member as a whole being flexible and being adapted to be placed in contact with said body in the vicinity of the part to be examined, locating means, arranged to maintain said member in place, and means for disposing said locating means in a predetermined position with respect to the source of said radiation.

4,053,782

DEVICE FOR ALIGNING AN X-RAY SOURCE WITH AN IMAGE RECEPTOR

Joseph J. Grass, Brookfield, Wis., assignor to General Electric Company, Schenectady, N.Y.

Filed Sept. 8, 1976, Ser. No. 721,555

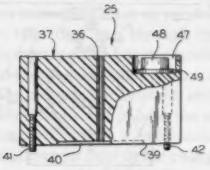
Int. Cl.[2] G03B *41/16*

U.S. Cl. 250—491 8 Claims

1. A device for determining when a selected ray in an x-ray beam which diverges from a focal spot is perpendicular to a predetermined plane, comprising:

a straight x-ray impermeable tube comprised of a wall having a concentric bore and having a length which is substantially greater than its inside and outside diameters,

support means for said tube constructed and arranged to permit radiation from said focal spot to be projected generally axially of said tube along the inside and outside



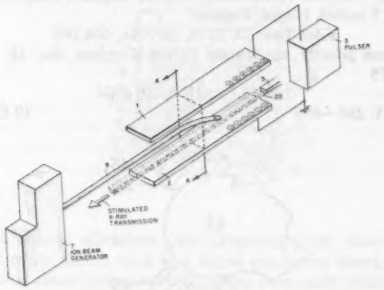
thereof and to permit said tube to be moved in the path of said beam, whereby perpendicularity of said selected ray will be indicated when the image of the inside and outside of said tube are concentric.

4,053,783

X-RAY LASER UTILIZING GAS JET

Marlan O. Scully, Tucson, Ariz., assignor to University Patents, Inc., Stamford, Conn.

Filed Oct. 29, 1974, Ser. No. 518,270
Int. Cl.[2] H01J *35/00*
U.S. Cl. 250—493 **5 Claims**



1. Apparatus for generating emission, comprising:
means for producing a gas jet target capable of population inversion;
means for generating an ion beam; and
means for scanning the ion beam along said gas jet so as to impinge thereon and cause emission therefrom, the scanning speed being substantially equal to the wavefront velocity of said emission.

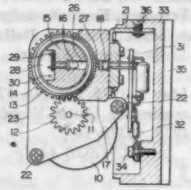
4,053,784

PHOTO SEQUENCE PROGRAMMER

Yoshikazu Kuze, 31-3, Higashi Magome 1-chome, Ota, Tokyo, Japan

Filed Dec. 5, 1975, Ser. No. 638,148
Claims priority, application Japan, Dec. 7, 1974, 49-140116
Int. Cl.[2] G06K *7/10*
U.S. Cl. 250—570 **15 Claims**

1. A photo sequence programmer comprising:
a rotary transparent cylinder;
a plurality of light-emitting elements disposed inside said cylinder;
a plurality of light-receiving elements disposed outside said cylinder, each light-emitting element facing a light-receiving element through said transparent cylinder between them;
opaque tapes attached on the surface of said cylinder in accordance with a predetermined arrangement to effect interruption of light being transmitted from said light-emitting elements to said light-receiving elements in a predetermined sequence as said cylinder rotates;



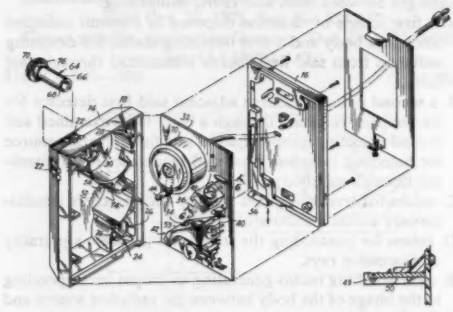
and a plurality of switching circuits including said plurality of light-emitting elements and said plurality of light-receiving elements, said switching circuits being actuatable in response to said interruption of light.

4,053,785

OPTICAL SMOKE DETECTOR WITH SMOKE EFFECT SIMULATING MEANS

Sung Chuel Lee, Bridgeport; Vaclav Oldrich Podany, Norwalk, both of Conn., and Hilario Simoes Costa, New Rochelle, N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Filed Jan. 7, 1976, Ser. No. 647,018
Int. Cl.[2] G01N *21/26*
U.S. Cl. 250—574 **5 Claims**



1. In a smoke detection apparatus in which there is included a housing enclosing a smoke detector chamber, a main light source mounted within the housing and a photocell device arranged within the housing for receiving substantial light from said main light source only when such light is scattered by smoke entering such chamber, the improvement which comprises a smoke effect simulating means, said means including an auxiliary or secondary light source, and means for selectively directing light from said auxiliary source onto said photocell so as to substitute for said light scattered by smoke, thereby to simulate the effect of the presence of smoke in said chamber.

4,053,786

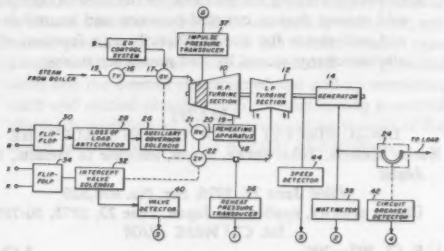
TRANSDUCER OUT OF RANGE PROTECTION FOR A STEAM TURBINE GENERATOR SYSTEM

Donald J. Jones, and Gary W. Berkebile, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 21, 1973, Ser. No. 427,429
Int. Cl.[2] F01K *13/02*
U.S. Cl. 290—52 **16 Claims**

1. A turbine system comprising:
a turbine having at least one high-pressure stage and at least one low-pressure stage,
an electrical generator driven by said turbine for supplying electrical power to a load,
means responsive to a predetermined mismatch between the

steam pressure sensed at the inlet to the low-pressure turbine stage and a representation of the electrical output of the generator for interrupting the flow of steam to at least part of the turbine for a predetermined interval of sufficient duration to permit correction of a partial load loss represented by said predetermined mismatch, and



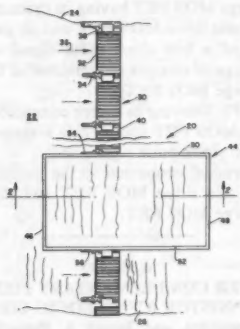
means responsive to a continued mismatch between the steam pressure sensed at the inlet of the low-pressure turbine and the representation of the electrical output of the generator after steam flow to the turbine has been reestablished for preventing continued interrupting of said steam flow.

4,053,787

MODULAR HYDROELECTRIC POWER PLANT

Richard E. Diggs, S. 12A Road, P.O. Box 776, Carthage, Mo. 64836

Filed Oct. 23, 1975, Ser. No. 625,177
Int. Cl.[2] F03B *13/00*
U.S. Cl. 290—54 **15 Claims**



13. Apparatus for converting water movement in a stream into usable power comprising:

a plurality of supporting members spaced apart transversely of the stream and being substantially flush with the stream bed and having supporting structure guide means;

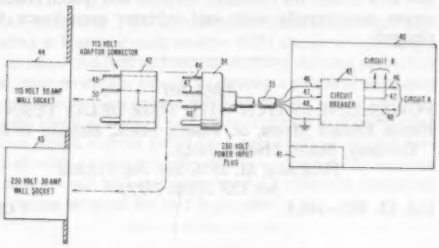
a plurality of separate, independent modules, each having a frame member located in the water and each having module guide means which are complementary to said supporting structure guide means for cooperation therewith to removably support said modules in said supporting structure in a manner such that said modules can be removed therefrom, said modules each being self-contained and separated from adjacent modules by said supporting member, each module further including an articulated turbine wheel rotatably attached to said frame member, each of said turbine wheels including a plurality of sections and partitions connecting adjacent sections together at the ends thereof, each section having a plurality of turbine blades with blades in one section being staggered with respect to blades in adjacent sections to be in spaced parallelism therewith for producing uniform rotation of said turbine wheel, a power generating means mounted on said frame member and connected to said turbine wheel for rotation therewith, and means mounted on said frame of each module for withdrawing power from said power generating means, said frame member of each module being mounted on said supporting structure to be beneath the surface of the water so that water flows over said frame member and cascades downwardly onto said turbine wheels to rotate same.

4,053,788

ELECTRICAL ENERGIZABLE APPARATUS AND ADAPTER CONNECTOR FOR USE THEREWITH

Edward Thomas Robie, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 11, 1976, Ser. No. 713,742
Int. Cl.[2] H02J *3/00*
U.S. Cl. 307—11 **8 Claims**



1. Electrical energizable apparatus, comprising:

a plurality of electrically energizable devices, each of a low voltage rating, which are operatively associated to perform a function,

at least two circuit means whose totality includes said devices, each circuit means being substantially current-load-balanced,

a high voltage input plug having at least two low voltage circuits individually connected to a separate one of said circuit means,

such that upon insertion of said input plug into a high voltage electrical input socket, each of said devices receives its rated low voltage, and

a passive adapter connector associated with said apparatus, having a high voltage socket portion cooperable with said input plug, and having a low voltage plug portion cooperable with a low voltage electrical input socket, said connector containing a branching electrical conductor circuit which connects each of said devices to its rated low voltage.

4,053,789

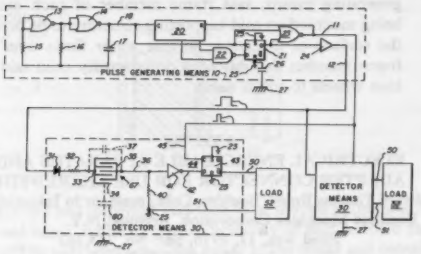
TOUCH ACTUATED SYSTEM RESPONSIVE TO A COMBINATION OF RESISTANCE AND CAPACITANCE

Sheldon L. Schultz, Bloomington, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 27, 1976, Ser. No. 718,230
Int. Cl.[2] H01H *35/00*
U.S. Cl. 307—116 **10 Claims**

1. A touch actuated system that responds to the touch of an animal, including: continuous pulse generating means for generating a pair of pulse outputs; at least one touch actuated detector means connected to receive said pair of pulse outputs; said detector means including a touch responsive area having two spaced conductor means which are adapted to be connected together resistively by an animal that has an inherent capacitance to ground; said touch responsive area having a first of said spaced conductor means connected to a first of said

pulse outputs through an asymmetrically conducting impedance means; said touch responsive area having a second of said spaced conductor means connected to pulse processing means; and said pulse processing means connected to a second of said



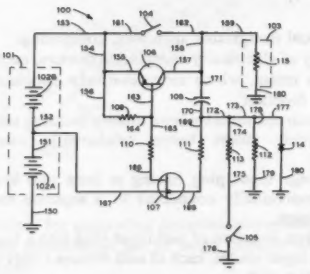
pulse outputs with said pulse processing means changing state to operate a load when an animal contacts said touch responsive area to alter the resistance between said spaced conductor means concurrently with said inherent capacitance being charged.

4,053,790

POWER LINE SWITCH WITH TIME DELAY TURN OFF

Harold Edward Myers, St. Joseph, Mich., assignor to Heath Company, Benton Harbor, Mich.

Filed Aug. 31, 1976, Ser. No. 719,302
Int. Cl.[2] H03K *17/26*
U.S. Cl. 307—141.4 **7 Claims**



1. A power conservative time delay cut-off switch having a power on and power cut-off state for permitting a load to receive power from a power source for a predetermined event actuated period of time corresponding to the time that the switch is in the power on state and which draws no power in the power off state, comprising:

a. a first switching device which has a conductive and a non-conductive state and includes input, output and control teminals, said input terminal being coupled to said power source and said output terminal being coupled to said load, for permitting power to reach said load while said device is in its conductive state;

b. bias means;

c. a second switching device which has a conductive and a non-conductive state and includes input, output and control terminals, said input terminal of said second device being coupled to said bias means and said output terminal of said second device being resistively coupled to the control terminal of said first device, for placing and maintaining said first device in the same conductivity state as said second device;

d. means for providing a pulse of short duration to said second device to intially place said second device in its conductive state;

e. means for storing an electric charge over said predetermined period which includes a first and second terminal, said first terminal being coupled to the output terminal of said first device and said second terminal being coupled, through a resistance of high impedance, to ground, for developing an electric charge for storage while said first device is in its conductive state; and

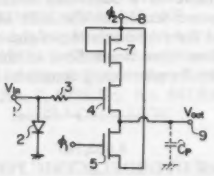
f. means for varying the potential on the control terminal of said second device, coupled between said second device and said means for storing, directly as a function of the electric charge stored by said means for storing.

4,053,791

LOGIC CIRCUIT OF RATIOLESS STRUCTURE

Kenzo Masuda, Tokorozawa, Japan, assignor to Hitachi, Ltd., Japan

Filed June 22, 1976, Ser. No. 698,520
Claims priority, application Japan, June 23, 1975, 50-75599
Int. Cl.[2] H03K *19/08*
U.S. Cl. 307—205 **3 Claims**



1. A logic circuit of a ratioless structure comprising:

an input terminal;

a drive MOS FET having its gate connected to said input terminal;

a pre-discharge MOS FET having its drain connected to the source of said drive MOS FET and its gate arranged for reception of a first clock pulse signal which causes a pre-discharge of charges accumulated at the drain of said pre-discharge MOS FET;

a load MOS FET having its source connected to the drain of said drive MOS FET and its gate arranged for reception of a second clock pulse signal; and

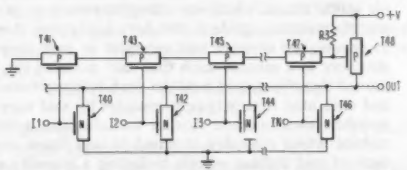
an output terminal connected to the junction between the source of said drive MOS FET and the drain of said pre-discharge MOS FET.

4,053,792

LOW POWER COMPLEMENTARY FIELD EFFECT TRANSISTOR (CFET) LOGIC CIRCUIT

Anthony T. Cannistra, and Joseph A. Petrosky, Jr., both of Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 27, 1974, Ser. No. 483,507
Int. Cl.[2] H03K *19/08, 19/34*
U.S. Cl. 307—205 **4 Claims**



1. A complementary field effect transistor logic circuit comprising:

an output node;

a first plurality of transistors of a first channel type connected in parallel between a first potential level and said output node, each said transistor receiving an input signal at a control electrode;

a pull-up transistor of a second channel type connected between said output node and a second potential level;

impedance means connected between said second potential level and a control electrode of said pull-up transistor; and

a second plurality of transistors of said second channel type connected in electrical series between said first potential level and the control electrode of said pull-up transistor, each said second plurality of transistors having a control electrode receiving an input corresponding to each of the inputs received by said first plurality of transistors.

4,053,793

MODULAR LOGIC CIRCUIT FOR PERFORMING DIFFERENT LOGIC FUNCTIONS

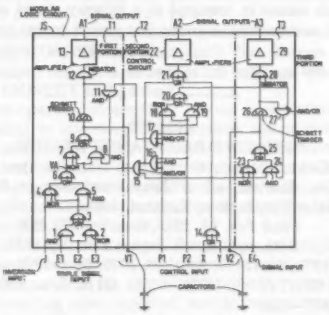
Wolfram Ernst, Munich; Josef Rohrig, Oberhaching, and Gerhard Renz, Neuried, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 25, 1976, Ser. No. 670,160

Claims priority, application Germany, Mar. 25, 1975, 2513153

Int. Cl.² H03K *19/08*

U.S. Cl. 307—207 **4 Claims**



1. A modular logic circuit for performing a plurality of differing logic functions comprising:

first, second and third portions,

said first portion comprising first logic circuit means for receiving first input pulse signals and for producing a first output pulse signal having a predetermined length and time position relationship to said first input pulse signals,

said third portion comprising third logic circuit means for receiving a third input pulse signal which is independent of said first input pulse signals and for producing a third output pulse signal having a predetermined length and time position relationship with said third input pulse signal,

said second portion comprising second logic circuit means including means for receiving control input signals and for producing therefrom control output signals, said control output signals having levels which cause said first and third logic circuit means to selectively produce said predetermined length and time position relationships.

4,053,794

SEMICONDUCTOR LOGIC GATES

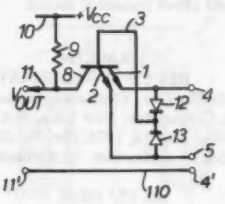
Colin Raymond Edwards, Frome, Somerset, England, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 19, 1975, Ser. No. 633,182

Claims priority, application United Kingdom, Nov. 21, 1974, 50528/74

Int. Cl.² H03K *19/08, 19/12, 19/32, 19/20*

U.S. Cl. 307—216 **19 Claims**



1. An integrated TTL compatible semiconductor logic gate including at least one multi-emitter NPN transistor including a base terminal and first and second emitters defining respective signal input terminals, means for causing a potential difference between said emitters only in response to logic signals of different logic levels at both of said input terminals and comprising separate direct current paths from said emitters to said base terminal with no functionally effective signal paths between said emitters and said transistor having a collector connected to an output terminal for said logic gate.

4,053,795

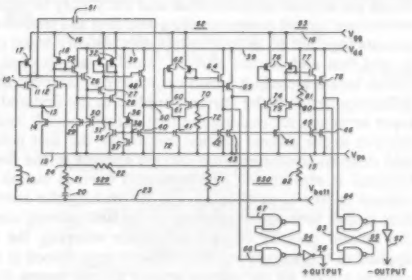
LOW LEVEL FIELD EFFECT TRANSISTOR AMPLIFIER

Michael J. Cochran, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed July 6, 1976, Ser. No. 702,824

Int. Cl.² H03K *5/20*

U.S. Cl. 307—350 **16 Claims**



1. A low-level field effect transistor amplifier comprising:

a. A pair of input field effect transistors arranged as a differential pair, each input field effect transistor having first and second electrodes and a gate;

b. field effect transistor means for connecting the first electrodes of said input field effect transistors to a circuit common, said field effect transistor means having at least one gate;

c. a pair of output field effect transistors, each output field effect transistor having first and second electrodes and a gate;

d. a first field effect transistor having first and second electrodes and a gate, the gate of which is connected to the second electrode of one of said input field effect transistors and the first electrode of which is coupled to the gate of one of said output field effect transistors;

e. a second field effect transistor having first and second electrodes and a gate, the gate of which is coupled to the second electrode of the other of said input field effect transistors and the first electrode of which is coupled to the gate of the other of said output field effect transistors;
f. first circuit means for resistively coupling the first electrodes of said output field effect transistors to said circuit common; and
g. second circuit means for connecting the first electrodes of said output field effect transistors to said at least one gate of said field effect transistor means.

4,053,796

RECTIFYING CIRCUIT

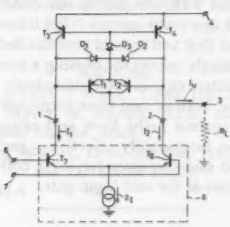
Rudy J. van de Plassche, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 14, 1976, Ser. No. 705,049

Claims priority, application Netherlands, July 23, 1975, 7508771

Int. Cl.² H03K *5/00*

U.S. Cl. 307—261 **10 Claims**



1. A rectifying circuit comprising first and second input terminals for receiving input currents which can exhibit a difference, which difference can be of a first or a second polarity, an output terminal, an electric supply terminal, a first current circuit connected between the first input terminal and the supply terminal, a second current circuit connected between the second input terminal and the supply terminal, current mirror circuit means coupling said first and second current circuits together so as to maintain substantially equal currents in said first and second current circuits, said current mirror circuit means including means responsive to the polarity of the difference between the currents applied to the first and second input terminals for making the first current circuit low-ohmic relative to the second current circuit for the first polarity of said difference whereby the current applied to the first input terminal is reproduced in the second current circuit by the current mirror circuit means, and for making the second current circuit low-ohmic relative to the first current circuit for the second polarity of said difference whereby the current applied to the second input terminal is reproduced in the first current circuit by the current mirror circuit means, third and fourth current circuits connected between the first and second input terminals, respectively, and the output terminal, said third and fourth current circuits each having a unidirectional current flow direction which are the same and each comprise the main current path of a transistor having a current output electrode coupled to the output terminal.

4,053,797

RECEIVE AMPLIFIER FOR PAM SIGNALS

Nam Tosuntikool, Belmont, and Gregor D. McGibbon, San Carlos, both of Calif., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Sept. 1, 1976, Ser. No. 719,531

Int. Cl.² H03K *5/00, 9/02;* H03F *1/02*

U.S. Cl. 307—262 **12 Claims**

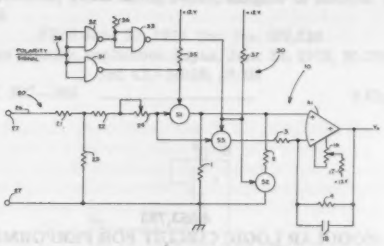
1. Apparatus for converting an input train of amplitude-varying pulses of one polarity to an output pulse train having a polarity as a function of a polarity signal which is associated with the input pulse train and has first and second amplitude levels corresponding to one and other polarities of output pulses, comprising:

first and second reference points;

first, second, third, and fourth resistors;

first, second, and third switch means;

a differential-input operational amplifier having a first input terminal connected through said first switch means to said first reference point, connected through said first resistor to said second reference point, and connected through the series combination of said second resistor and said second



switch means to said second point, and having a second input terminal electrically connected through the series combination of said third resistor, which is an input resistor, and said third switch means to said first point and connected through said fourth resistor, which is a feedback resistor, to an output terminal of said amplifier; and

control means responsive to the polarity signal for closing said first switch means and opening said second and third switch means in response to a polarity signal of the first level, and for opening said first switch means and closing said second and third switch means in response to a polarity signal of the second level.

4,053,798

NEGATIVE RESISTANCE DEVICE

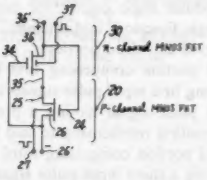
Susumu Koike, Ibaraki; Gota Kano, Nagaoka-kyo, and Iwao Teramoto, Ibaraki, all of Japan, assignors to Matsushita Electronics Corporation, Kadoma, Japan

Filed Feb. 13, 1976, Ser. No. 658,052

Claims priority, application Japan, Feb. 20, 1975, 50-21634; Apr. 18, 1975, 50-47810; Sept. 17, 1975, 50-112925

Int. Cl.² G11C *11/40;* H03K *3/353;* G11C *5/02;* H01L *29/78*

U.S. Cl. 307—238 **19 Claims**



1. A negative resistance device comprising:

a complementary pair of FETs, each of which operates in depletion mode and includes a first pair of regions defining a source and drain and a second gate region and which are connected in series with each other by a first region of one FET connected to a first region of the other FET and by a gate region of each FET connected to at least one first region of the other FET, and

a pair of external terminals respectively connected to a first

region of each of said FETs which is not connected to the other FET

at least one of said FETs being an insulated gate type non-volatile memory device comprising, at the gate region, an insulation film which stores electric charge therein to memorize in non-volatile manner.

4,053,799

VOLTAGE MEMORY DEVICE

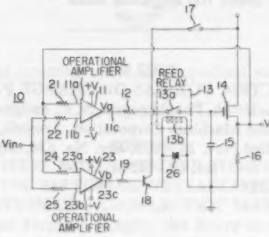
Shunji Minami, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 5, 1976, Ser. No. 683,474

Claims priority, application Japan, May 8, 1975, 50-54919; Aug. 19, 1975, 50-114529[U]; May 30, 1975, 50-65491

Int. Cl.² H03K *5/20*; G11C *27/02*

U.S. Cl. 307—351 **7 Claims**



1. An analog voltage memory device comprising

a. an input resistor,

b. a reed relay having one contact connected to one terminal of said input resistor,

c. a MOSFET having the gate thereof connected to the other contact of said reed relay,

d. a nonpolarized capacitor interconnected between the gate of said MOSFET and ground,

e. an output resistor interconnected between the source of said MOSFET and ground,

f. a first operational amplifier having a noninverting input terminal, an inverting input terminal, and an output terminal, said source being connected to said inverting input terminal, means for applying an input signal to said noninverting input terminal, said output terminal of said first operational amplifier being connected to the other terminal of said input resistor, and

g. a second operational amplifier having an inverting input terminal connected to said source, a noninverting input terminal, means for applying said input signal to said noninverting input terminal, and an output terminal coupled to a coil of said reed relay for energizing said relay only when said input voltage is higher than the voltage at said source, whereby said analog voltage memory device provides an output voltage across said output resistor whose magnitude follows the peak of said input voltage.

4,053,800

STATOR FOR ELECTRIC MOTOR

Michael Hanning, Oerlinghausen, and Fritz Mehrmann, Augustdorf, both of Germany, assignors to Hanning Elektro Werke Robert Hanning, Bielefeld, Germany

Filed Dec. 17, 1975, Ser. No. 641,657

Claims priority, application Germany, Dec. 21, 1974, 2460964

Int. Cl.² H02K *1/04*

U.S. Cl. 310—43 **9 Claims**

1. An electric machine comprising:

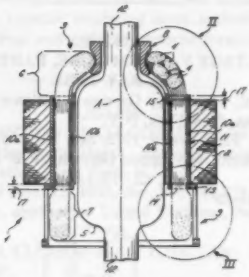
a stack of stator plates having a central throughgoing passage defining an axis and an array of inwardly opening axial grooves in said passage;

an insulating lining in each of said grooves;

a plurality of stator coils forming a tubular stator winding having a generally cylindrical central portion lying in said grooves, an end portion formed as a dome with a central aperture at said axis to one axial side of said stack, and another end portion to the other axial side of said stack;

means for securing together and physically stabilizing said coils at the domed end portion; and

a rotor rotatable within said stator winding about said axis and having a shaft extending on said axis through said aperture of said domed end portion and another shaft



extending on said axis in the opposite direction past said other end portion, said means for securing being an insert cage radially within said domed end portion and formed at least partially of a diameter substantially less than the inside diameter of said passage of said stack, said rotor having between said shafts a diameter corresponding generally to said inside diameter, said insert cage being formed as a body of revolution centered on said axis and of evenly decreasing inside diameter in an axial direction away from said stack.

4,053,801

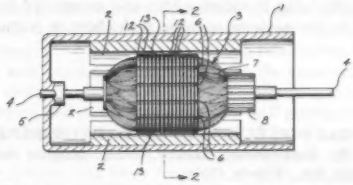
ARMATURE STRUCTURE FOR PERMANENT MAGNET D-C MOTOR

Glen Ray, Big Bend, and Leonard W. Leniewski, New Berlin, both of Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.

Filed Oct. 24, 1975, Ser. No. 625,634

Int. Cl.² H02K *1/06*

U.S. Cl. 310—216 **2 Claims**



1. A permanent magnet motor, the combination comprising:

a sleeve made of a high permeability material and having a circular cylindrical inner surface;

a set of pole pieces made of a permanent magnet material and fastened to the inner surface of said sleeve and positioned equidistantly around its circumference, each of said pole pieces extending along the length of the sleeve and fixed distance to define a pole face which is directed radially inward toward a central axis, said pole faces defining a circular cylindrical cavity;

a shaft extending along said central axis through said sleeve and being journaled for rotation about said axis;

a set of armature plates made of a high permeability material, said armature plates having a circular shape and each

being fastened to the shaft for rotation about said central axis in a plane substantially perpendicular to said axis, and said armature plates being spaced apart along said shaft to substantially fill the circular cylindrical cavity defined by said pole faces; and

in which the spacing between armature plates is substantially equal to the length of the air gap formed between the pole faces and the circular outer perimeter of each armature plate.

4,053,802

HIGH-VOLTAGE VACUUM TUBE, PARTICULARLY AN X-RAY TUBE

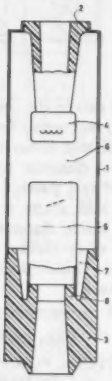
Walter Hartl, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 9, 1975, Ser. No. 656,618

Claims priority, application Germany, Feb. 18, 1975, 2506841

Int. Cl.² H01J 35/00

U.S. Cl. 313—55 **4 Claims**



1. A high-voltage vacuum tube comprising an envelope having a metal portion and within the envelope a cathode, an anode, and an insulator member, said metal portion in the operation of said tube being at a high negative voltage relative to said anode, said insulator being provided with a recess open to the interior of the tube and spacedly surrounding the anode, said anode being mounted within said recess and being connected to the insulator member at the bottom portion of the recess.

4,053,803

GAS DIELECTRIC OVERCOAT FOR PANEL

Roger E. Ernsthausen, Luckey, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 406,022, Oct. 12, 1973, Pat. No. 3,943,394, which is a continuation-in-part of Ser. No. 204,700, Dec. 3, 1971, abandoned, which is a continuation-in-part of Ser. No. 70,745, Sept. 8, 1970, Pat. No. 3,634,719. This application Dec. 9, 1975, Ser. No. 639,147

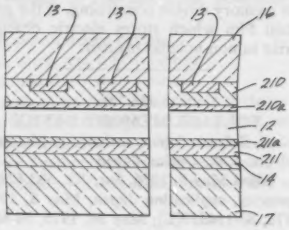
The portion of the term of this patent subsequent to Mar. 9, 1993, has been disclaimed.

Int. Cl.² H01J 65/00, 61/02, 61/35

U.S. Cl. 313—201 **6 Claims**

1. In a gas discharge display/memory device characterized by an ionizable gas medium in a gas chamber formed by a pair of opposed dielectric material charge storage members having surfaces in contact with the gas medium and at least one electrode insulated from the gas medium by a dielectric member,

the improvement wherein each dielectric gas contacting surface is at least partially coated with a layer of at least one inorganic lead compound selected from the group consisting of lead chloride, lead iodide, lead bromide, and



lead fluoride, said lead compound layer having a thickness of at least about 100 angstrom units.

4,053,804

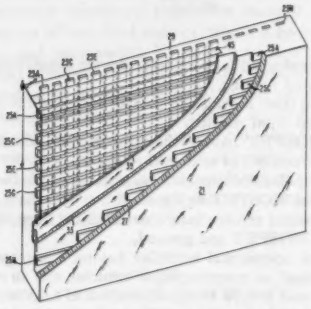
DIELECTRIC FOR GAS DISCHARGE PANEL

M. Osama Aboelfotoh, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 28, 1975, Ser. No. 636,180

Int. Cl.² H01J 17/04

U.S. Cl. 313—218 **13 Claims**



1. In a gaseous discharge display device, the combination comprising

an ionizable gaseous medium,

a pair of nonconductive support members,

conductor arrays formed on each of said support members, and a dielectric medium insulating at least one of said conductor arrays from contact with said gaseous medium, said ionizable gaseous medium contacting surface of said dielectric medium comprising a gold doped oxide in an amount sufficient to increase the memory margin of the panel while affording relatively stable operating voltages.

4,053,805

ARC DISCHARGE LAMP COMPRISING MERCURY, SCANDIUM AND LITHIUM IODIDE, SCANDIUM EMISSION BEING SUPPRESSED

John A. Scholz; Phillip J. Gardner, both of Danvers, Mass., and H. Graham Silver, Kings Point, N.Y., assignors to GTE Sylvania Incorporated, Danvers, Mass.

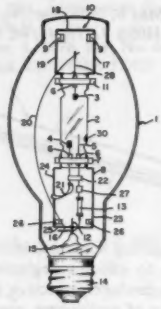
Filed Dec. 9, 1974, Ser. No. 530,786

Int. Cl.² H01J 17/20, 61/18

U.S. Cl. 313—229 **1 Claim**

1. A red emitting metal halide arc discharge lamp comprising an arc tube having sealed ends and electrodes disposed in said ends and a fill within said arc tube comprising mercury,

scandium and lithium iodide, the relationship between the scandium and the lithium iodide being such that lithium is the primary light emitting metal and scandium emission is suppressed.



4,053,806

PYROELECTRIC DETECTOR COMPRISING NUCLEATING MATERIAL WETTABLE BY AQUEOUS SOLUTION OF PYROELECTRIC MATERIAL

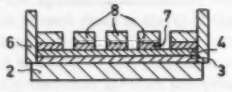
Andrew Alfred Turnbull, Reigate, and Harry Sewell, Horsham, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,449

Claims priority, application United Kingdom, Sept. 2, 1974, 38214/74

Int. Cl.² H01J *29/45, 31/49, 39/00*

U.S. Cl. 313—388 **12 Claims**



1. A pyroelectric detector comprising a substrate, supporting a thin, solid layer of pyroelectric material selected from the group comprising TGS and triglycine fluoroberyllate which are partly or wholly deuterated and a layer of nucleating material selected from the group consisting of aluminum, titanium, matt carbon, magnesium fluoride aluminum oxide, and silica and wettable by an aqueous solution of the pyroelectric material and to which the pyroelectric material adheres intermediate the pyroelectric layer and the substrate.

4,053,807

THERMIONIC CATHODE AND HEATER STRUCTURE ON CERAMIC BASE PLATE

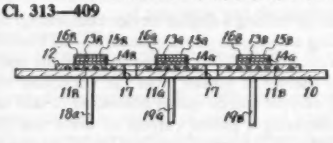
Torao Aozuka, Chofu; Akio Ohkoshi; Shoichi Muramoto, both of Tokyo; Akira Nakayama, Fuchu, and Koichiro Sumi, Inagi, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 31, 1976, Ser. No. 672,501

Claims priority, application Japan, Apr. 3, 1975, 50-40590

Int. Cl.² H01J *29/50, 29/46, 19/18*

U.S. Cl. 313—409 **10 Claims**



1. A thermionic cathode structure, comprising:

a. a ceramic base plate;

b. a heater layer of tungsten coated on a predetermined area of said ceramic base plate;

c. a ceramic insulating layer coated on said ceramic base plate and covering said heater layer;

d. a cathode lead layer of tungsten coated on a portion of said ceramic insulating layer superposed over said area of the ceramic base plate;

e. a base metal layer coated on said cathode lead layer; and

f. a cathode material coated on said base metal layer, said heater layer, ceramic insulating layer, cathode lead layer, base metal layer and cathode material forming a cathode member.

4,053,808

ELECTRON BEAM COLLIMATOR

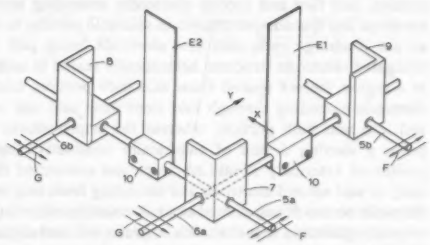
Jack Peacock, Haywards Heath, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 12, 1976, Ser. No. 741,376

Claims priority, application United Kingdom, Nov. 13, 1975, 46891/75

Int. Cl.² H01J *29/02;* **G21K** *1/04*

U.S. Cl. 313—458 **2 Claims**



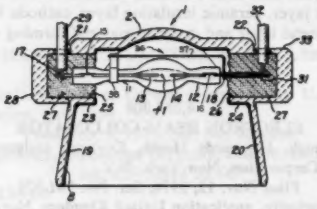
1. An electron beam collimator comprising a tube structure of rectangular cross-section and hwich is defined by first substantially rigid wall members each of which comprises two planar wall portions which meet to form a corner of the tube structure and by further intermediate rigid planar wall members, each side of the tube structure comprising one of the wall portions of one of said first wall members and one of the wall portions of another of said first wall members and at least one intermediate planar wall portion formed by one of the intermediate planar wall members, and each wall portion in each side being arranged in overlapping and sliding relationship with an adjacent wall portion in that side so that the cross-section of the tube structure, and hence of the beam emerging therefrom, can be varied, and means for moving the wall portions relative to one another to vary the cross-section of the tube structure, said means comprising first and second elements which are movable towards and away from one another, and third and fourth elements which are movable towards and away from one another in a direction at right angles to the direction of movement of the first and second elements, one of the first wall members connected to the first and third elements for movement with each of these two elements relative to the other, another of the first wall members being connected to the first and fourth elements for movement with each of these two elements relative to the other, another of the first wall members being connected to the second and third elements for movement with each of these two elements relative to the other, the other of the first wall members being connected to the second and fourth elements for movement with each of these two elements relative to the other, and the intermediate wall member or members in each side of the tube structure being connected to a respective one of the first, second, third and fourth elements for movement therewith.

4,053,809

SHORT-ARC DISCHARGE LAMP WITH STARTING DEVICE

Elmer G. Fridrich, Chardon, and Rolf S. Bergman, Cleveland Heights, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed June 18, 1976, Ser. No. 697,426
Int. Cl.[2] H01J 61/54
U.S. Cl. 313—198 11 Claims



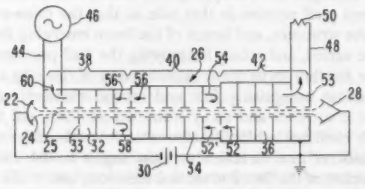
1. An arc discharge lamp comprising an envelope having a bulb portion and an elongated stem extending from said bulb portion, and first and second electrodes extending into said envelope and spaced apart therein in said bulb portion to define an arc discharge path, said first electrode being part of an elongated electrode structure hermetically sealed in said stem at a region thereof spaced from said bulb portion, said first electrode extending through said stem from said seal region and into said bulb portion, wherein the improvement comprises a starting device of electrically conductive material positioned externally of said envelope and connected electrically to said second electrode and extending from said second electrode to and fitting around and substantially encircling said stem alongside said first electrode between said seal region and said bulb portion.

4,053,810

LOSSLESS TRAVELING WAVE BOOSTER TUBE

Bertram G. James, Redwood City, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed June 25, 1976, Ser. No. 699,763
Int. Cl.[2] H01J 25/34
U.S. Cl. 315—3.6 6 Claims



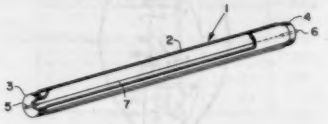
1. In a traveling-wave amplifier tube, a coupled-cavity slow-wave circuit adapted to interact with a stream of electrons over an extended path, output transmission line means coupled to an output end of said circuit at the downstream end of said path, means for coupling electromagnetic energy to an input end of said circuit at the upstream end of said path, the improvement wherein: a plurality of cavities forming a first portion of said circuit nearer said output end have outer walls with larger dimensions transverse to said beam path than those of a plurality of cavities forming a second, adjacent portion nearer said input end, whereby the upper cutoff frequency of said first portion is lower than that of said second portion.

4,053,811

FLUORESCENT LAMP SIMULATOR

Robert Ray Abernethy, 7295 Walton Road, Walton Hills, Ohio 44146

Filed May 8, 1975, Ser. No. 575,628
Int. Cl.[2] H05B 41/16, 41/46; H01C 1/02
U.S. Cl. 315—95 13 Claims



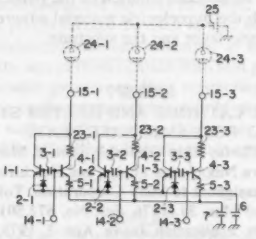
1. For use in a lighting apparatus including a ballast circuit normally operable to effect energization of plural electric discharge lamps to produce respective normal lumen outputs and respective pairs of socket-type connectors in which the terminals of respective lamps may be located for electrical connection in said ballast circuit and for mechanical support of said lamps, the improvement comprising means for nonreactively completing at least a portion of said ballast circuit when one of said lamps has been removed therefrom thereby to enable said ballast circuit effectively to energize at least one remaining lamp in circuit connection therewith to produce its normal lumen output, said means for substantially completing said ballast circuit being insertable into a pair of sockettype connectors from which a lamp has been removed for mechanical support by said pair of socket-type connectors and to electrically couple the same.

4,053,812

SYSTEM FOR DRIVING A DISPLAY DEVICE

Tetsunori Kaji, and Masashi Mizushima, both of Hachioji, Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 4, 1975, Ser. No. 565,267
Claims priority, application Japan, Apr. 5, 1974, 49-37955
Int. Cl.[2] H05B 37/00
U.S. Cl. 315—169 TV 22 Claims



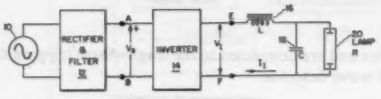
1. A system for driving a display device comprising: display means including at least one photo element having characteristics such that each of the firing voltage level and the operating voltage level thereof is greater than the extinction voltage level thereof; current source means connected to said display means for generating a pulsed current to drive said display means; and first setting means connected to said display means for setting the voltage applied to said photo element to a value less than the extinction voltage level thereof at the trailing edge of the pulsed current.

4,053,813

DISCHARGE LAMP BALLAST WITH RESONANT STARTING

William P. Kornrumpf, Schenectady, N.Y., and Thomas M. Jahns, Twin Lakes, Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 1, 1976, Ser. No. 662,529
Int. Cl.[2] H05B 37/00
U.S. Cl. 315—206 3 Claims



1. A discharge lamp circuit comprising:

an output circuit including a discharge lamp, an inductor connected in series with said lamp, and a capacitor connected in parallel with said lamp; and

a transistorized inverter circuit source of ac voltage connected in series with said output circuit, said source including means for automatically adjusting the frequency of said ac voltage in response to the impedance of said output circuit and functioning so that said ac voltage is adjusted to the approximate resonant frequency of said output circuit as such times as the Q of said output circuit is high and is adjusted away from said resonant frequency at such times as the Q of said output circuit is not high;

wherein said transistorized inverter comprises:

a transformer including a primary winding defining a first end, a second end, and a center tap, and further including a secondary winding having a first end and a second end, the polarity of said windings being chosen so that the first end of said primary winding is positive when the first end of said secondary winding is positive, the center tap of said primary winding being connected to a first polarity supply voltage;

a first transistor having an emitter connected to a second polarity of said supply voltage, a collector connected to the second end of said primary winding, and a base connected to the first end of said secondary winding;

a first resistor and a first bias diode connected in series between the base of said first transistor and the emitter of said first transistor;

a second transistor having an emitter connected to said second polarity supply voltage, a collector connected to the first end of said primary winding, and a base;

a capacitor connected between the base of said second transistor and the second end of said secondary winding;

a second resistor and a second diode connected between the base of said second transistor and the emitter of said second transistor;

a third diode connected from the collector of said first transistor to the emitter of said first transistor;

a fourth diode connected from the collector of said second transistor to the emitter of said second transistor; and

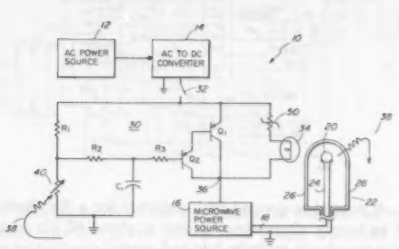
a pair of output terminals connected respectively to the first end of said primary winding and the second end of said primary winding, whereby a square wave voltage is produced between said pair of output terminals.

4,053,814

CONTINUOUS AUTOMATIC STARTING ASSIST UV CIRCUIT FOR MICROWAVE POWERED ELECTRODELESS LAMPS

Robert J. Regan, Needham; Paul O. Haugsjaa, Acton, and William H. McNeill, Carlisle, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed July 14, 1976, Ser. No. 705,328
Int. Cl.[2] H05B 41/16, 41/24
U.S. Cl. 315—248 8 Claims



1. In an electrodeless light source having a source of power at a microwave frequency, an electrodeless lamp with an envelope made of a light-transmitting material and a volatile fill material emitting light upon breakdown and excitation and a termination fixture having an inner conductor and an outer conductor disposed around the inner conductor, the lamp being disposed at one end of the conductors to form a termination load for the microwave source coupled to the other end of the conductors, a starting control circuit including:

a. the source including a dc power source and a microwave power source receiving the dc power for providing microwave power in an amount related to the amount of dc power, the microwave power output being coupled to the inner and outer conductors,

b. switch means for controlling the application of dc power to the microwave power source,

c. a UV light source disposed near the lamp and coupled in series between the dc power source and the microwave power source to emit UV light upon activation of the switch means to assist in starting the lamp, the UV source upon emission of light decreasing the amount of dc power coupled to the microwave power source to reduce the output thereof,

d. means for continuously decreasing the dc current through the UV source and increasing the dc voltage for the microwave power source in relation to the amount of light generated within the fixture as the lamp is started,

e. transistor means coupled between the dc power source and microwave power source and across the UV source to provide a shunt path therearound whose impedance is a function of the state of conduction of the transistor means, and

f. light sensitive means responsive to the light from the lamp for controlling the conductive state of the transistor means to regulate the dc power applied to the microwave power source in direct relation to the amount of light from the lamp.

4,053,815

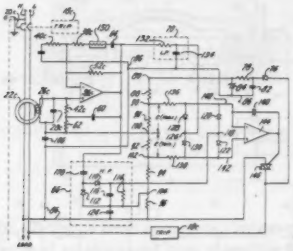
GROUND FAULT INTERRUPTERS

Richard C. Sircom, Scarborough, Canada, assignor to Federal Pacific Electric Company, Newark, N.J.

Continuation of Ser. No. 395,422, Sept. 10, 1973, Pat. No. 3,879,639, which is a continuation of Ser. No. 320,855, Jan. 4, 1973, abandoned. This application Apr. 17, 1975, Ser. No. 569,061

Int. Cl.² H02H *3/28*

U.S. Cl. 361—42 **5 Claims**



1. A neutral-to-ground fault detector for a distribution circuit to supply alternating current at about 60 Hz to a load, where the circuit includes line and neutral conductors extending to load-connection terminals, and where the neutral conductor has a ground connection, said neutral-to-ground fault detector including a differential current transformer having a core, single turn primary windings forming current paths in series with said line and neutral conductors respectively, between said load-connection terminals and said ground connection of said neutral conductor, said primary windings being arranged to produce mutually concelling magnetic effects in the core due to load current carried thereby, and a multi-turn winding on the core, means including a capacitor connected to said multiturn winding for producing resonance therein at a frequency substantially higher than 60 Hz, said core and said resonated winding being formed to have a Q greatly in excess of unity at the resonant frequency, means for exciting said resonated winding within its pass band, and means for detecting the reduction of Q of the resonated winding resulting from a neutral-to-ground fault on the portion of said neutral conductor remote from said ground connection, and line-to-ground leakage detecting means having control means selectively responsive to 60 Hz signals exceeding a prescribed level and having input signal means coupled to said core.

4,053,816

PROTECTION MEANS FOR OBJECTS INCLUDED IN ELECTRICAL POWER SUPPLY NETWORKS

Gunnar Nimmersjo, Vetterslundsgatan 20, S-724 62 Vasteras, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden

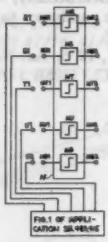
Filed Nov. 7, 1975, Ser. No. 629,787

Claims priority, application Sweden, Nov. 21, 1974, 7414614

Int. Cl.² H02H *3/26*

U.S. Cl. 361—62 **2 Claims**

1. Protection means for objects included in electrical power supply networks, comprising a three-phase directional wave detector with two inputs per phase, three single-phase and one three-phase tripping output, one three-phase blocking output, and one level detector with one partial detector for each of the single-phase tripping outputs and the three-phase blocking output, said level detector is provided with a further partial detector connected to the three-phase tripping output of the wave detector, and said two partial detectors are connected to the three-phase outputs of the wave detector and have a lower reference level than the other partial detectors of the level



detector and are connected to the single-phase tripping outputs of the wave detector.

4,053,817

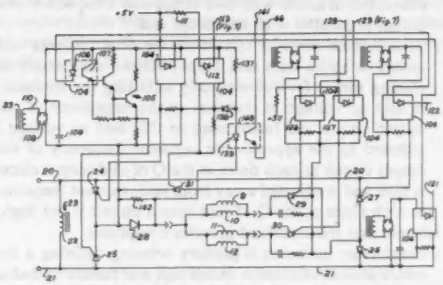
ELECTROMAGNETIC VIBRATOR

Maynard Charles Yeasting, Elmore, Ohio, assignor to Rexnord Inc., Milwaukee, Wis.

Filed June 17, 1976, Ser. No. 697,030

Int. Cl.² H02K *33/14*

U.S. Cl. 318—128 **8 Claims**



1. In an electromagnetic vibrator comprising a work member to be vibrated, an exciter member, and resilient means connecting the members to form a vibratory system, a drive comprising an electromagnetic motor having a part on each of said members and a control for energizing said motor, said control comprising means for energizing said motor during at least part of a first half cycle of an alternating current power line voltage cycle, means for deenergizing the motor during a subsequent half cycle, and synchronizing means adapted to select as said first half cycle the first half cycle of the power line voltage that starts when said resilient means are near maximum extension in a selected direction.

4,053,818

GYRO SLAVING/BOOT STRAP AMPLIFIER

James R. Younkin, 2900 Sheryl, Fayetteville, Ark. 72701

Filed Apr. 1, 1976, Ser. No. 672,741

Int. Cl.² G05B *11/32*; G05F *1/00*

U.S. Cl. 318—562 **17 Claims**

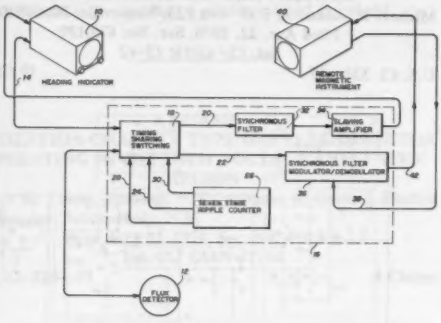
1. A gyro slaving/boot strap amplifier for driving a heading indicator and a remote magnetic instrument, comprising in combination:

switching means receiving input signals from the heading indicator and magnetic position data from a flux detector to provide a heading error signal and an angular position signal,

a timer generating a time sharing signal to said switching means to alternate the operation thereof between provid-

ing the heading error signal and the angular position signal,

a slaving circuit responsive to the heading error signal from said switching means to provide a drive voltage to the heading indicator, and



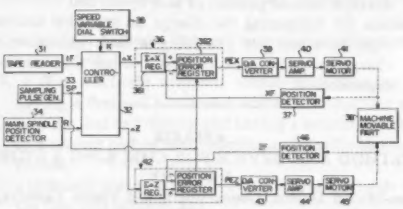
a boot strap circuit responsive to the angular position signal from said switching means to provide an energizing signal to the remote magnetic instrument.

4,053,819

NUMERICAL CONTROL SYSTEM FOR LATHES

Mitsuo Matsumoto, Kokubunji, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Mar. 31, 1976, Ser. No. 672,440
Claims priority, application Japan, Oct. 15, 1975, 50-123233
Int. Cl.[2] G05B *19/18*
U.S. Cl. 318—636 **9 Claims**



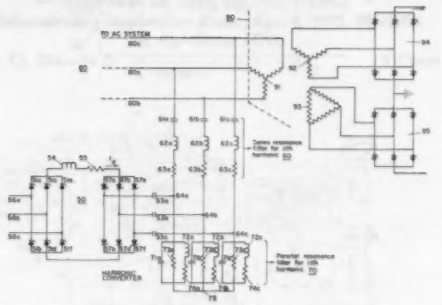
1. A numerical control system for lathes, comprising a numerical data source for providing numerical instruction data defining a feed per minute instruction mode, feed per spindle revolution instruction mode and a thread cutting instruction mode; a sampling pulse generator for generating a sampling pulse for each predetermined time Δt; a spindle position detector mechanically mounted on a spindle of the lathe, dividing one rotation of the spindle and delivering an output corresponding to any divided position on the spindle as a cyclic function from a spindle reference position; and a controller adapted to calculate, in said feed per minute instruction mode, instruction position increment values corresponding to a tool moving amount for each said predetermined time on the basis of said numerical data, to calculate, in said feed per revolution instruction mode, instruction position increment values corresponding to a tool moving amount for said predetermined time on the basis of said numerical data and an amount of spindle rotation detected for each said predetermined time at said spindle position detector and to calculate, in said thread cutting instruction mode, instruction position increment values corresponding to a tool moving amount for each predetermined time on the basis of said numerical data and spindle revolution position data from a spindle reference position detected for each said predetermined time at said spindle position detector.

4,053,820

ACTIVE FILTER

Harold A. Peterson, Madison, Wis., and Narendra Mohan, Minneapolis, Minn., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Jan. 29, 1976, Ser. No. 653,307
Int. Cl.[2] H02M *1/12*
U.S. Cl. 363—44 **13 Claims**


TO AC SYSTEM
SERIES RESONANCE FILTER FOR 11th HARMONIC
PARALLEL RESONANCE FILTER FOR 13th HARMONIC
INVERTING CONVERTER

1. A filtering network for suppression of currents having a frequency that is a given harmonic of a base frequency of a multiphase alternating current power source, said filtering network comprising:

a. a passive resonance filter network for each phase of said alternating current power source tuned at a fixed frequency value corresponding to said given harmonic frequency of said base frequency; and

b. means associated with said passive filter for injection into each phase of said multiphase alternating current power source an injected current of such magnitude, phase and frequency that the sum of the harmonic current in each phase and the injected current are substantially zero, said means including a harmonic converter having a source of variable magnitude unidirectional current and commutated switching elements for producing said injected harmonic currents by converting the unidirectional current from said source into a plurality of alternating currents each being injected into one of said phases and having a frequency determined by the rate of commutation of said switching elements, a phase as determined by the delay or advance of the commutation of said switching elements and a magnitude determined by the value of the magnitude of current produced by said variable magnitude unidirectional current source.

4,053,821

VOLTAGE MULTIPLIER CIRCUIT

R. Kenneth Hose, Jr., Cupertino; Keith Riordan, Sunnyvale, and Stephen M. Martin, Pleasanton, all of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Jan. 26, 1976, Ser. No. 652,442
Int. Cl.[2] H02M *3/155*
U.S. Cl. 363—60 **18 Claims**

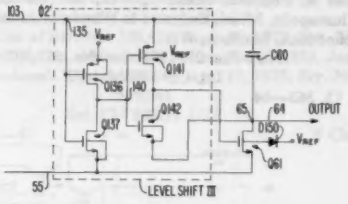
1. A voltage multiplier circuit comprising:

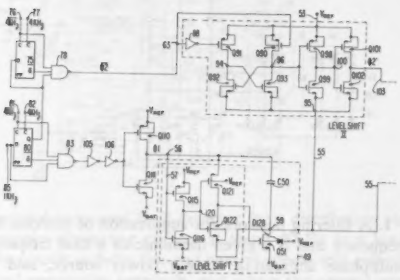
a source of a reference clock signal;

a voltage source;

a pair of cascaded inverters forming a first voltage level shift means, a first of said pair of inverters being coupled between said voltage source and ground potential, and having an input thereof coupled to said reference clock signal and an output coupled to an input of the second of said pair of cascaded inverters, said second inverter being coupled between said reference clock signal and an output of the voltage multiplier circuit;

charge storage means coupled in parallel with said second inverter; and,





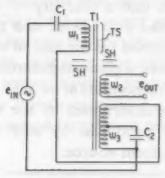
switching means coupled between said output of the multiplier circuit and said voltage source, and having a switching input coupled to an output of said second inverter.

4,053,822

SUBHARMONIC FREQUENCY GENERATOR

Herman Irving Tillinger, Morris Township, and Ralph Walk, Randolph Township, both of Morris County, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 23, 1976, Ser. No. 753,713
Int. Cl.[2] H02M *5/16*
U.S. Cl. 363—172 **10 Claims**



1. A subharmonic frequency generator comprising

input means for accepting a signal of a given frequency,

a transformer including a primary winding coupled to said input means, a secondary winding, and a magnetic core linking said primary and secondary windings,

magnetic path means for diverting a portion of the flux generated in response to current in said primary winding from coupling with said secondary winding to derive a specific transformer inductance,

said magnetic core designed to have a portion of the core encompassed by said primary winding saturate in response to said given signal, said magnetic shunts diverting sufficient flux from a portion of the core encompassed by said secondary winding to maintain operation therein within a linear range,

a first resonant circuit tuned to a first selected frequency and including said primary winding,

a second resonant circuit tuned to a second selected frequency and including said primary winding,

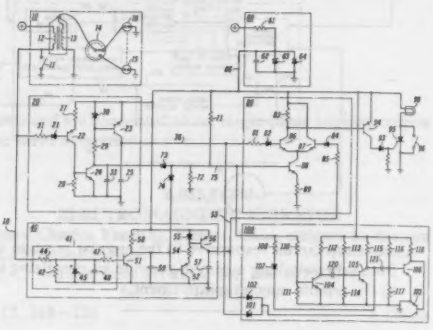
the saturable part of said core producing harmonic and beat frequencies and said transformer inductance forming a linear inductance component common to said first and second resonant circuits.

4,053,823

IGNITION ARC MONITOR CIRCUIT

Michael R. Adamian, P.O. Box 223, Naperville, Ill. 60540

Filed Apr. 22, 1976, Ser. No. 679,139
Int. Cl.[2] G01R *13/42*
U.S. Cl. 324—17 **10 Claims**



1. Ignition arc monitor circuit for use with an internal combustion engine having an ignition system having a defined operating cycle, comprising:

a first capacitor;

first circuit means for charging said first capacitor during a first portion of said operating cycle;

a second capacitor;

second circuit means for charging said second capacitor during a second portion of said cycle; and

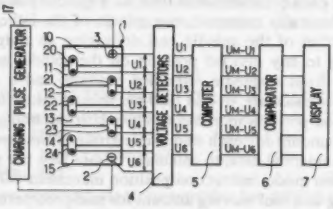
means for comparing the charge on said first and second capacitors and for providing a fault indication if the charge on said second capacitor is less than on said first capacitor.

4,053,824

METHOD AND DEVICE FOR CHECKING A STORAGE BATTERY

Jean-Michel Dupuis, Gennevilliers, and Pierre Lasserre, Nanterre, both of France, assignors to Compagnie Europeenne d'Accumulateurs S.A., Paris, France

Filed July 26, 1976, Ser. No. 708,452
Claims priority, application France, July 30, 1975, 75.2382
Int. Cl.[2] G01N *27/42*
U.S. Cl. 324—29.5 **4 Claims**



1. A method of checking a lead battery of series connected storage cells at the end of the battery production line, comprising the following steps, in order:

fully charging said lead battery at the end of battery production;

measuring an elementary transient open circuit voltage at the terminals of each storage cell in a time period from the

end of charging which ranges from a few tens of minutes to about ten hours;

comparing said elementary voltages with the average transient voltages of said storage cells; and

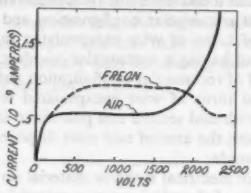
rejecting the battery if the difference between said average transient voltage and one of said elementary transient voltages is greater than a predetermined threshold.

4,053,825

IONIZATION CHAMBER TYPE GAS LEAK DETECTOR OPERATING IN THE HIGH VOLTAGE AVALANCHE REGION

James R. Young, Rexford, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 22, 1974, Ser. No. 490,586
Int. Cl.² G01N 27/66
U.S. Cl. 324—33 **4 Claims**



1. A gas leak detector device comprising:

ionization chamber means open to the ambient for sampling the ambient atmosphere in the region of said ionization chamber means and for producing charged particles means including

a. a chamber having a first end open to the ambient and a second end,

b. a first electrode disposed within said chamber and having a first end positioned within said chamber adjacent the first end thereof and having a second end closer to a second end of said chamber and rigidly supported thereat,

c. a radioactive source attached to said first electrode near the first end thereof, and

d. a second electrode disposed within said chamber, having a pointed first end positioned in close proximity to said radioactive source for increasing the electric field therebetween upon a high voltage being applied across said first and second electrodes, and having a second end closer to the second end of said chamber and rigidly supported thereat;

said second electrode being oriented perpendicular to said radioactive source so that the pointed first end or said second electrode is the closest portion thereof to the radioactive source, said second electrode and a portion of said first electrode including the second end thereof being oriented parallel to each other and to the longitudinal axis of said chamber; and

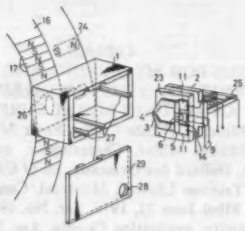
means connected to said ionization chamber means for operating said ionization chamber means in the high voltage avalanche region of the current versus applied voltage characteristics of the leak detector device which provides a significantly larger current change for a particular rate of a gas leak being detected than if said ionization chamber means was operated in the saturated current region of the current versus applied voltage characteristics so that the leak detector device is substantially more sensitive to smaller leaks of the gas.

4,053,826

APPARATUS FOR DETECTION OF ROTATIONAL ANGLE AND NUMBER OF ROTATIONS OF A ROTARY BODY

Kiyoshi Wasawa, Fujisawa; Toru Kita, Yokohama; Takao Sugisaki, and Minoru Higurashi, both of Tokyo, all of Japan, assignors to TDK Electronics Co., Ltd., Tokyo and Nissan Motor Company, both of, Japan

Filed Mar. 30, 1976, Ser. No. 671,983
Claims priority, application Japan, Apr. 4, 1975, 50-40984
Int. Cl.² G01R 33/00
U.S. Cl. 324—34 D **1 Claim**



1. Apparatus for detecting the rotational angle and the number of rotations of a rotary body, comprising:

a housing of magnetic shield material;

a magnetic shield plate dividing said housing into two compartments;

a first insulating board disposed in one of said compartments parallel to said shield plate;

a second insulating board disposed in the other compartment perpendicular to said shield plate;

a pair of input terminals and a pair of output terminals disposed on each of said boards;

a magnetic yoke affixed to each of said boards, each yoke comprising a pair of ferrite poles pieces having a relatively narrow air gap therebetween adjacent a given edge of the corresponding board and a relatively wide separation therebetween in a region remote from said air gap, and a wire having a layer of magnetic material exhibiting uniaxial magnetic anisotropic characteristics plated thereon, said layer having a hard magnetization axis in the axial direction of said wire, and an easy magnetization axis in the circumferential direction of said wire, said wire being connected between said pole pieces at said remote region,

a coil wound on said wire, the ends of said coil being electrically connected across the corresponding pair of output terminals;

a capacitor on said board having its terminals electrically connected across the corresponding pair of output terminals;

means electrically connecting the ends of each wire across the corresponding pair of input terminals;

means for applying an alternating current signal having a predetermined frequency to each pair of input terminals;

said given edges of said boards being disposed adjacent a given surface of said housing, said housing having apertures in said surface, an aperture therein communicating with each compartment, each of said boards being positioned so that the ends of the corresponding pole pieces forming said air gaps extend into said apertures;

first and second juxtaposed parallel coaxial rotary disks comprising magnetized magnetic material;

means for securing said disks to said rotary body for rotation therewith about the axis of said disks;

the periphery of each disk having alternating N and S magnetic poles disposed thereon, the number of magnetic poles on the periphery of one disk being substantially greater than the number of magnetic poles on the periphery of the other disk;

said disks being disposed adjacent said given surface of

housing so that each of said air gaps is adjacent the periphery of a corresponding disk,

whereby one of said pair of output terminals provides a signal of twice said predetermined frequency for predetermined increment of rotation of said body, and the other pair of output terminals provides another signal of twice said predetermined frequency for each substantially greater increment of rotation of said body.

4,053,827

APPARATUS FOR MEASURING, AND INDICATING, THE THICKNESS OF A NON-METALLIC COATING ON AN ARCUATE METAL SURFACE

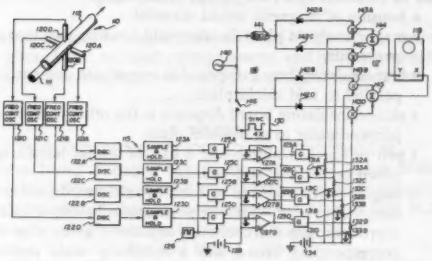
Louis Guy Millette, Pointe Claire; Peter Murphy, Longueuil; Georges Michel Miller, Chateauguay, and Wieslaw Josef Tyszewicz, Dollard des Ormeaux, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed June 21, 1976, Ser. No. 698,008

Claims priority, application Canada, Apr. 30, 1976, 251557

Int. Cl.[2] G01R 33/12

U.S. Cl. 324—34 TK **6 Claims**



1. Apparatus for measuring, and indicating, the thickness of a non-metallic coating on an arcuate metal surface, comprising:

at least one measuring head for positioning relative to said coating;

at least one support member on each measuring head for supporting said measuring head relative to said coating;

a sensing member on each measuring head and arranged to develop a signal representative of the distance between said sensing member and said arcuate metal surface;

a profiled surface on said support member for presentation to said coating, said profiled surface having a Vee shape with convex arcuate sides when viewed in a direction parallel to the axis of the arcuate metal surface, the arcuate sides initially defined by sequentially positioning a series of metal cylindrical mandrels of different diameters relative to the sensing member with the axes of the mandrels lying in a common plane normal to the sensing member, so as to develop a signal of the same magnitude from the sensing member for each mandrel, each arcuate side being a curve which is tangential to the peripheries of the mandrels at these respective positions, the penetration of said arcuate metal surface and coating into said Vee shape varying with the outer diameter of the coating to offset variations in the signals resulting from variations in the outer diameter of the non-metallic coating;

signal processing means connected to said sensing member, for processing said signal from said sensing member;

means connected to said signal processing means for displaying an output therefrom, said output indicative of the thickness of said non-metallic coating.

4,053,828

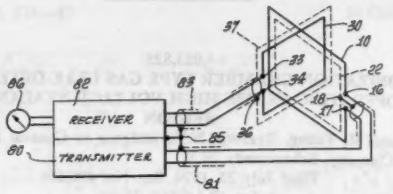
METAL DETECTOR WITH FIRST AND SECOND NESTED RECTANGULAR COILS

Frank E. Ambler, Sepulveda; Carl James Duthler, Westhills, and Norton L. Moise, Pacific Palisades, all of Calif., assignors to Xonics, Inc., Van Nuys, Calif.

Filed May 3, 1976, Ser. No. 682,514

Int. Cl.[2] G01R 33/12

U.S. Cl. 324—41 **19 Claims**



1. In a two coil metal detector, the combination of:

a first coil of rectangular configuration and comprising a plurality of turns of wire encapsulated in an insulating material and having a rectangular opening;

a second coil of rectangular configuration and comprising a plurality of turns of wire encapsulated in an insulating material, with said second coil positioned in said first coil opening with the axes of said coils disposed substantially at a right angle;

a first layer of electrical resistive material on said first coil;

a second layer of electrical resistive material on said second coil, each of said layers of electrical resistive material having a resistance in the range of about 1,000 to about 100,000 ohms per square unit of area;

means for making electrical connections to said coils and layers; and

an encapsulating material in the gap between said coils binding said coils together in a fixed relation, with said coils adjusted relative to each other for substantially minimum coupling between the coils.

4,053,829

APPARATUS FOR DETECTING THE DIRECTION OF A MAGNETIC FIELD TO SENSE THE POSITION OF, FOR EXAMPLE, A ROTARY ELEMENT OR THE LIKE

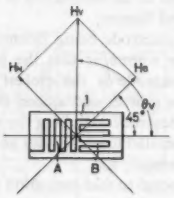
Tsunehiro Maruo, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed July 21, 1975, Ser. No. 597,818

Claims priority, application Japan, July 31, 1974, 49-87732

Int. Cl.[2] G01R 33/06

U.S. Cl. 324—46 **17 Claims**



1. Apparatus for detecting the direction of an external rotary magnetic field comprising in combination:

a magnetoresistive element having an insulating substrate, a first set of substantially longitudinal ferromagnetic metal film strips disposed in serpentine configuration on said substrate for providing a first main current conducting path, a second set of substantially longitudinal ferromag-

netic metal film strips disposed in serpentine configuration on said substrate perpendicular to said first set of film strips for providing a second main current conducting path perpendicular to said first main current conducting path, a first end of said first set of strips being electrically connected to a first end of said second set of strips to define a junction, a first current supply terminal connected to the opposite end of said first set of strips and a second current supply terminal connected to the opposite end of said second set of strips, and an output terminal connected to said junction between said strips for supplying an output signal;

a stationary bias magnet located adjacent to said magnetoresistive element for supplying a bias field thereto at a predetermined angle relative to one of said current conducting paths, said bias field being parallel to the plane of said substrate; and

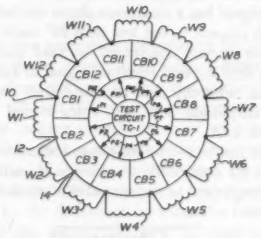
said magnetoresistive element being positionable in said external field so that said external rotary magnetic field is applied to said element parallel to the plane of said substrate at an angle θ relative to one of said current conducting paths, wherein θ varies from 0° to 360°, thereby providing a composite magnetic field at said element with a component due to said bias field and a component due to said external rotary field for causing said output signal to vary as a function of θ.

4,053,830

ARMATURE WINDING TERMINATION CONTINUITY TESTER AND METHOD

James L. Porter, Shaker Heights, Ohio, assignor to Avtron Manufacturing, Inc., Cleveland, Ohio

Filed Nov. 10, 1976, Ser. No. 740,559
Int. Cl.² G01R *31/02, 31/04*
U.S. Cl. 324—51 **13 Claims**



1. Apparatus for testing armature winding termination continuity of an armature having a circular array of commutator bars and a plurality of armature windings each having its opposite ends terminated to a different one of said bars so as to define a plurality of sets of bar-to-bar winding terminations, comprising:

means for simultaneously applying test currents of equal value to flow through each said set of bar-to-bar winding terminations to develop respective bar-to-bar voltages;

means for simultaneously measuring voltage differences between the voltages developed across different selected pairs of all of said sets of bar-to-bar winding terminations;

means for simultaneously determining whether any of said voltage differences exceeds a reference limit; and,

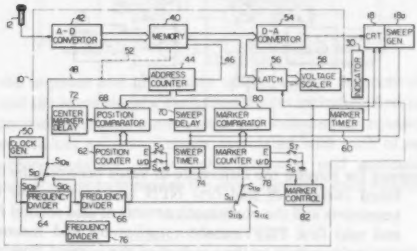
means for providing an output indication dependent upon said determination.

4,053,831

WAVEFORM ANALYSIS SYSTEM

Masamichi Furukawa, and Susumu Iguchi, both of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Mar. 29, 1976, Ser. No. 671,212
Claims priority, application Japan, Mar. 30, 1975, 50-38160; Mar. 31, 1975, 50-38830; Mar. 31, 1975, 50-38831; Mar. 31, 1975, 50-38832
Int. Cl.² G01R *23/16*
U.S. Cl. 324—77 A **25 Claims**



1. A waveform analysis stysem, comprising:

a digital memory;

a display unit to display a waveform stored in the digital memory;

an address counter to sequentially address storage locations in the digital memory for display;

a marker counter to designate a storage location for display of a marker corresponding to said designated storage location on the display unit;

a clock pulse generator to generate clock pulses to drive the address counter and the marker counter;

marker counter switch means to selectively enable the marker counter to be driven by the clock pulses;

marker comparator means to sense for a same count in the address counter and the marker counter and generate an indicator enable signal in response thereto;

indicator means to numerically indicate contents of said designated storage location in response to the indicator enable signal; and

magnification means for controlling the display unit to display a selected section of the storage locations in magnified form;

the display unit further comprising a sweep generator for generating a sweep signal of predetermined duration, the magnification means comprising a frequency divider and magnification switch means for connecting the frequency divider between the clock pulse generator and the address counter while the sweep signal is being generated by the sweep generator.

4,053,832

A.C. POWER METER

Carl T. Nelson, Sunnyvale, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed May 24, 1976, Ser. No. 689,235
Int. Cl.² G01R *21/06*
U.S. Cl. 324—142 **6 Claims**

1. A multiplier circuit comprising:

First and second PNP transistors and first and second NPN transistors, each of said trainsistors having emitter, base, and collector electrodes,

means coupling the emitters of all of said transistors to a first terminal,

means coupling the collectors of said first NPN and said second PNP transistors together,

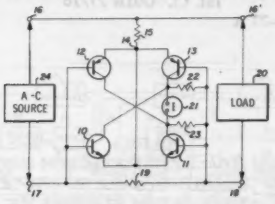
means coupling said coupled first NPN and second PNP collectors to a second terminal,

means coupling the collectors of said second NPN and said first PNP transistors together,

means coupling said coupled second NPN and first PNP collectors to said second terminal,

means coupling the bases of said second PNP and NPN transistors together and to said second terminal,

means coupling the bases of said first NPN and PNP transistors together and to a third terminal, and



means for sensing the difference in value between the combined currents of said first NPN and said second PNP transistors and the combined currents of said second NPN and said first PNP transistors whereby said means for sensing responds to the product of the current flowing in combined transistor emitters and the voltage difference existing between the coupled bases of said first NPN and PNP transistors and the coupled bases of said second NPN and PNP transistors.

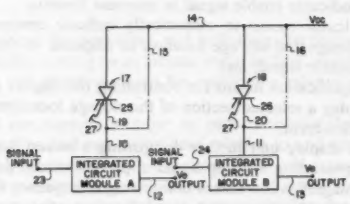
4,053,833
CONTACTLESS TEST METHOD FOR INTEGRATED CIRCUITS

Paul R. Malmberg, Pittsburgh, Pa.; Robert M. Handy, Phoenix, Ariz.; Donald F. Stoneburner, Monroeville, Pa., and David Green, Painted Post, N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 441,924, Feb. 12, 1974, Pat. No. 3,956,698. This application Feb. 27, 1975, Ser. No. 553,780

Int. Cl.[2] G01R *31/26, 15/12*

U.S. Cl. 324—158 R **6 Claims**



1. A method of contactless testing an integrated circuit comprising:

A. fabricating integrally with an integral circuit to be tested a plurality of conductive semiconductor elements with different resistance values and having outputs electrically connected to at least one input to said integrated circuit, each conductive semiconductor element (i) having an input adapted for electrical connection to an electrical source and an output electrically connected to at least one input of said integrated circuit, and (ii) being adapted to electrically conduct when exposed to a radiation beam and supply at a connected input or inputs to said integrated circuit a desired electrical input;

B. connecting inputs of said conductive semiconductor elements to at least one electrical source;

C. selectively exposing at least one said conductive semiconductor element with a radiation beam to cause said conductive element to electrically conduct and supplying a plurality electrical inputs of different voltage levels at the connected inputs of said integrated circuit from the electrical source; and

D. measuring electrical responses of at least a segment of the integrated circuit to said electrical input to determine whether said circuit segment possesses specified electrical characteristics.

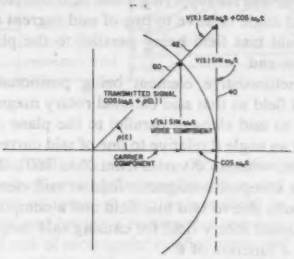
4,053,834
NARROWBAND PHASE MODULATION COMMUNICATION SYSTEM WHICH ELIMINATES THRESHOLDING

Theodore Lerner, Williamsville, N.Y., assignor to Textron, Inc., Providence, R.I.

Continuation-in-part of Ser. No. 350,353, April 12, 1973, abandoned. This application Sept. 12, 1975, Ser. No. 612,952

Int. Cl.[2] H04B *1/62;* **H02B** *1/00;* **H04B** *1/10*

U.S. Cl. 325—46 **5 Claims**



1. A narrowband phase modulation voice communication system characterized by the absence of thresholding effects at useful signal-to-noise ratios, comprising in combination:

transmitter means for transmitting a signal having a voice signal component and receiver means for receiving the transmitted signal;

said transmitter means including carrier signal generator means for generating a carrier signal of fixed amplitude, voice signal input means for generating a voice signal, and phase modulator means connected to said carrier signal and to said voice signal for producing a resultant signal in the form of a variable amplitude resultant signal having a voice signal component and a fixed amplitude carrier signal component in phase quadrature, said voice signal component having a maximum amplitude whereby said resultant signal has a maximum phase deviation ϕ which is large with respect to but less than 90° such that $\sin\phi \neq \phi$, and limiter means connected to said phase modulator means for limiting said resultant signal to a constant amplitude signal whereby said carrier signal component is of variable amplitude and said voice signal component is attenuated; and

said receiver means including phase locked loop demodulator means for coherently tracking said variable amplitude carrier component to recover said attenuated voice signal component.

4,053,835
APPARATUS FOR TRANSMITTING HIGH FREQUENCY SIGNALS

Otto Breitenbach, Nuremberg, Germany, assignor to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Germany

Filed Jan. 30, 1976, Ser. No. 653,645

Claims priority, application Germany, Feb. 20, 1975, 2507191

Int. Cl.[2] H04B *1/00*

U.S. Cl. 325—51 **9 Claims**

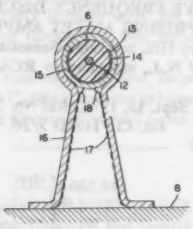
1. Apparatus for transmitting high frequency signals to a vehicle adapted to travel along a predetermined path comprising:

a reflecting high frequency cable disposed parallel to said path, said reflecting high frequency coaxial cable including a central conductor for radiation high frequency information, coaxial outer conductor means enabling said high frequency information to be conveyed and a coaxially

disposed layer of dielectric material intermediate said central and outer conductors;

support means for mounting said coaxial cable in parallel with said predetermined path, said support means including metallic material disposed along the length of said coaxial cable; and

means for electrically connecting said coaxial outer conductor to said metallic material at predetermined intervals along the length of said coaxial cable.



4,053,836

DEVICE FOR TRANSMISSION OF INFORMATION BY PULSE CODE FREQUENCY SHIFT MODULATION

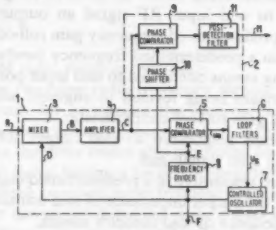
Jean Fellrath, Neuchatel, Switzerland, assignor to Centre Electronique Horloger S.A., Neuchatel, Switzerland

Filed Aug. 13, 1975, Ser. No. 604,196

Claims priority, application Switzerland, Aug. 22, 1974, 11477/74

Int. Cl.[2] H04B *1/26;* H04L *27/14*

U.S. Cl. 325—320 **8 Claims**



1. A device for receiving information by frequency shift keying, the received information being a binary input signal wherein two characteristic frequencies corresponding to the binary digits "O" and "I" are in a predetermined ratio, comprising a phase-locking superheterodyne receiver having only one local oscillator phase controlled by the input signal and a mixer for producing an intermediate signal frequency equivalent to half the shift of the input signal frequency, the said shift being defined by the difference between the two characteristic frequencies of the digits "O" and "I", and a demodulator formed by a phase detector coupled to receive the intermediate frequency signal and a signal of the same frequency obtained from the local oscillator, said phase detector determining whether, in balance, the phase between these signals is in the region of 0° or 180°.

4,053,837

QUADRIPHASE SHIFT KEYED ADAPTIVE EQUALIZER

Carl R. Ryan, Mesa, and James H. Stilwell, Scottsdale, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Continuation of Ser. No. 586,105, June 11, 1975, abandoned. This application Nov. 26, 1976, Ser. No. 745,264

Int. Cl.[2] H03H *7/36*

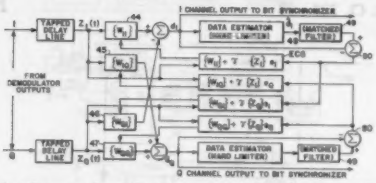
U.S. Cl. 325—323 **5 Claims**

1. A quadraphase shift keyed (QPSK) adaptive equalizer having in-phase and quadrature channels for equalizing incoming demodulated QPSK signals, comprising:

a. first and second tapped delay lines connected to received the demodulated signals and provide in-phase and quadrature output signals in the in-phase and the quadrature channels;

b. means for developing error signals connected to an output of each of the in-phase and quadrature channels; and

c. in-phase and quadrature filter means connected to receive the in-phase and quadrature output signals, respectively, and the error signals, each filter means including first and second adjustable components and independent equalizer coefficient generator means associated with each of said components for individually adjusting said associated components to minimize the error signals in each channel.



4,053,838

RADIO RECEIVER

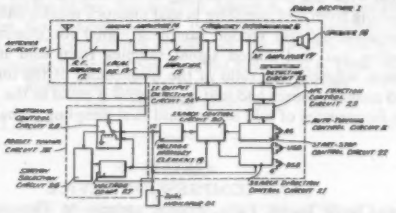
Yuji Amaya, Kobe, Japan, assignor to Fujitsu Ten Limited, Kobe, Japan

Filed Dec. 23, 1975, Ser. No. 643,640

Claims priority, application Japan, Dec. 24, 1974, 49-472; Dec. 24, 1974, 49-476; Dec. 26, 1974, 50-148392; Dec. 26, 1974, 50-148393; Dec. 25, 1974, 49-871; June 30, 1975, 50-81732

Int. Cl.[2] H04B *1/34*

U.S. Cl. 325—470 **15 Claims**



4. A radio receiver having a tuning circuit with a variable reactance element and a tuning frequency controlled by a variable tuning control voltage applied to the variable reactance element and a plurality of tuning control circuit parts having different station selection modes, each of said tuning control circuit parts having output lines and providing an output via its output lines, said radio receiver comprising

function selection circuit means connecting the tuning control circuit parts to the variable reactance element of the radio receiver, said function election circuit means comprising variable control voltage generating means, for providing a variable tuning control voltage to the variable reactance element from the outputs of said tuning control circuit parts;

a plurality of clamp diodes;

a plurality of bistable circuits each having a pair of inputs and a pair of outputs, each of said bistable circuits having one of its outputs connected to the output lines of a corresponding one of the tuning control circuit parts via corresponding ones of the clamp diodes;

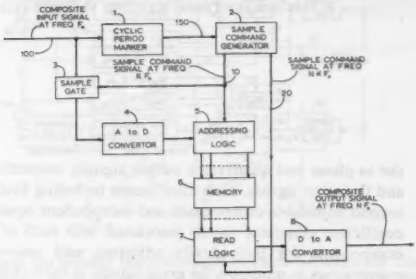
a plurality of function selection switches each connected to a corresponding one of the inputs of a corresponding one of the bistable circuits; and

circuit means connecting the other input of each of the other bistable circuits to said one input of each of said bistable circuits in a manner whereby when any of the function selection switches is closed, the clamp diodes other than those connected to the output of the corresponding bistable circuit are clamped thereby making the outputs of the tuning control circuit parts connected to the bistable circuits with the open function selection switches ineffective.

4,053,839
METHOD AND APPARATUS FOR THE FREQUENCY MULTIPLICATION OF COMPOSITE WAVES

George Knoedl, Jr., 139 Waverly Ave., Patchogue, N.Y. 11772

Filed May 29, 1973, Ser. No. 364,647
Int. Cl.[2] H03B 19/00
U.S. Cl. 328—38 27 Claims

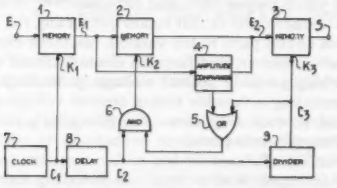


1. A frequency multiplying system comprising a source of a time varying input signal to be multiplied, memory means, cyclic period marker means responsive to said input signal source for producing pulses at the fundamental frequency of said input signal, means responsive to said cyclic period marker means for producing first and second sampling signals having frequencies which are multiples of the fundamental frequency of said input signal means for continuously sampling said input signal with said first sampling signal and storing signal samples resulting from said sampling in said memory means, and means responsive to said second sampling signal for continuously reading out said stored signal samples from said memory means, whereby the ratio of the frequencies of the output of said memory means and said input signal is equal to the ratio of the frequencies of said second and first sampling signals.

4,053,840
BAND COMPRESSION DEVICE

Jean-Claude Baron, Paris, France, assignor to Thomson-CSF, Paris, France

Filed July 27, 1976, Ser. No. 709,109
Claims priority, application France, Aug. 1, 1975, 75.24148
Int. Cl.[2] H03K 5/20; H04B 1/66
U.S. Cl. 328—151 9 Claims

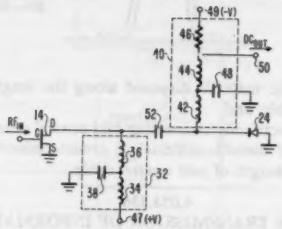


1. A band compression device for receiving input signals of predetermined frequency bandwidth and for delivering output signals of bandwidth n times narrower comprising:
sampling means for sampling said input signals;
storing means for storing at least two successive samples in a series of n successive samples;
amplitude comparing means for comparing said samples taken in pairs and for providing a logic transfer control signal depending on each of said amplitude comparisons;
an output memory for receiving the sample greatest in amplitude in said series and delivering said output signal; and
control means connected to said storing means, said output memory and receiving said logic control signal for transferring said greatest of the compared samples to said output memory.

4,053,841
MICROWAVE FREQUENCY DISCRIMINATOR COMPRISING AN FET AMPLIFIER

Arye Rosen, Cherry Hill, and Louis Sebastian Napoli, Hamilton Square, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 13, 1976, Ser. No. 722,582
Int. Cl.[2] H03D 3/26
U.S. Cl. 329—103 12 Claims

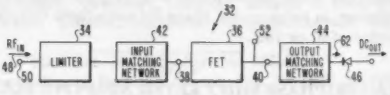


1. A microwave frequency discriminator comprising:
a transistor amplifier including a field effect transistor having first, second and third electrodes, said transistor amplifier having an output port, and an input port for receiving an input RF signal of substantially constant power level, said transistor being biased an amount for generating in response to said input RF signal an output RF signal having a predetermined frequency gain roll-off characteristic within a predetermined frequency bandwidth;
input shaping means connected to said input port, said input shaping means being formed to augment said transistor frequency gain roll-off characteristic;
detector means responsive to said output RF signal for generating a dc signal; and
biasing means responsive to a predetermined bias voltage for matching the output impedance of said transistor with the input impedance of said detector means,
whereby at said conditions of matched impedances the voltage of said dc signal varies substantially linearly as a function of the frequency of said input RF signal.

4,053,842
MICROWAVE FREQUENCY DISCRIMINATOR COMPRISING AN FET AMPLIFIER

Zygmond Turski, Selden, N.Y., and Daniel David Mawhinney, Livingston, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 13, 1976, Ser. No. 722,585
Int. Cl.[2] H03D 3/26
U.S. Cl. 329—103 8 Claims



1. A microwave frequency discriminator comprising:
a transistor amplifier including a field effect transistor having an output port and an input port for receiving an input RF signal of substantially constant power level, said transistor being biased an amount for generating an output RF signal within a predetermined frequency bandwidth in response to said input RF signal;

input and output matching means connected to said input and output ports, respectively,

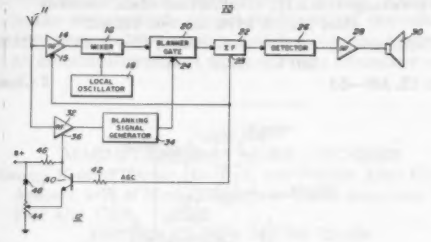
said input and output matching means being formed to provide selected input and output impedance conditions to said amplifier such that the power of said output RF signal varies substantially linearly with the frequency of said input RF signal throughout said frequency bandwidth; and

detector means responsive to said output RF signal for generating a D.C. signal varying substantially linearly as a function of the frequency of said input RF signal.

4,053,843
BLANKER INHIBIT CIRCUIT

Larry Richard Wright, Glenview, and Donald Charles Cohlman, Rolling Meadows, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 25, 1976, Ser. No. 670,217
Int. Cl.[2] H04B *1/10*
U.S. Cl. 325—479 **5 Claims**



1. An AM radio receiver including:

means for receiving radio frequency signals;

tuner means for processing the received radio frequency signals and producing audio output signals in response thereto, the tuner means also producing an automatic gain control signal having a level representative of the magnitude of the received radio frequency signals;

a blanker circuit for detecting noise pulses in the received radio frequency signals and blanking the tuner means in response thereto; and

inhibit means for inactivating the blanker circuit responsive to the automatic gain control signal assuming a predetermined level corresponding to a minimum received radio frequency signal level,

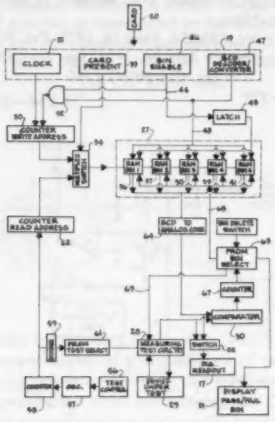
whereby when the received radio frequency signals exceed the minimum value the inhibit means inactivates the blanker circuit.

4,053,844
CARD-READER INTEGRATED CIRCUIT TESTER

Moise N. Hamaoui, Sunnyvale, Calif., assignor to Moise N. Hamaoui; Halfon N. Hamaoui and Robert Hacco, all of Sunnyvale, Calif., part interest to each

Filed Sept. 26, 1975, Ser. No. 617,242
Int. Cl.[2] H03F *21/00;* **G01R** *19/00*
U.S. Cl. 330—2 **20 Claims**

1. Apparatus for checking one or more electrical parameters of a plurality of similar electronic circuit devices to be tested comprising: means for extracting from programming means information providing a plurality of differing tolerance comparison values for a parameter of such devices to be checked, said values represent differing classfication groups into which said plurality of similar electronic circuit devices are to be distributed; means for measuring the value of the parameter of one of said electronic circuit devices to be checked; means for comparing the measured value of the parameter with said plurality of differing tolerance comparison values to identify a

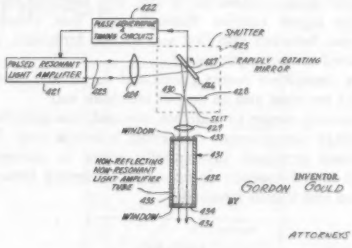


classification group corresponding to said measured value; and means for displaying the results of said comparison.

4,053,845
OPTICALLY PUMPED LASER AMPLIFIERS

Gordon Gould, 329 E. 82 St., New York, N.Y. 10028

Continuation of Ser. No. 644,035, March 6, 1967, abandoned, and Ser. No. 804,540, April 6, 1959, abandoned, said Ser. No. 644,035, is a division of said Ser. No. 804,540, and a continuation-in-part of Ser. No. 804,539, April 6, 1959. This application Aug. 16, 1974, Ser. No. 498,065
Int. Cl.[2] H01S *3/091, 3/22*
U.S. Cl. 330—4.3 **12 Claims**



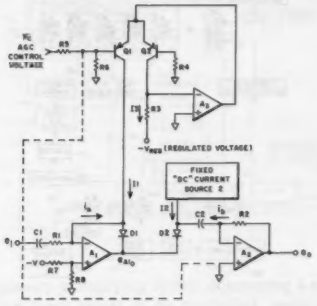
1. Apparatus for light amplification comprising a bounded volume containing an excitable medium, the atoms, ions or molecules of said medium having well defined energy states including a lowest state, a lower state above said lowest state, and a higher state above said lower state, and a bright pumping light source composed of a radiative substance different from said medium which substance emits energy in a spectral range which can be absorbed by said medium, the major portion of the energy absorbed by said medium causing transitions of the atoms, ions, or molecules thereof to populate the higher state, said bright pumping light source being arranged to direct light into said medium to excite said atoms, ions, or molecules to emit light photons in the bounded volume when stimulated to do so by the presence of stimulating light at a frequency substantially corresponding to the emitted light due to transitions from the higher state to the lower state, said emitted light having substantially the same phase, frequency, polarization and wavefront shape as the stimulating light, thus adding coherently to the amplitude of the stimulting light.

4,053,846

AMPLIFIER APPARATUS

William F. Acker, Seminole, Fla., assignor to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 589,954, June 24, 1975, Pat. No. 3,992,616.
This application July 16, 1976, Ser. No. 705,984
Int. Cl.² H03G *3/30*
U.S. Cl. 330—279 **17 Claims**



1. A variable gain amplifier for amplifying non-zero frequency components of an input signal, said amplifier comprising:

a first characteristic means, having a nonlinear voltage-current relationship occurring between first and second terminals thereof, capable of carrying a significant current directed from said first terminal to said second terminal;

a second characteristic means, having a nonlinear voltage-current relationship occurring between third and fourth terminals thereof, capable of carrying a significant current directed from said third terminal to said fourth terminal, said second and fourth terminals being electrically connected together;

an input means connected to said first terminal to provide input signal current through said first characteristic means, between said first and second terminals, which is related to said input signal;

a first capacitive means connected in series between said third terminal and an output terminal; and

maintaining means to maintain selected non-zero frequency voltage components occurring between said first and second terminals substantially equal to corresponding non-zero frequency components occurring between said third and fourth terminals.

4,053,847

SELF-FEEDBACK TYPE LOW-NOISE CHARGE SENSITIVE AMPLIFIER

Tadashi Kumahara, and Seturo Kinbara, both of Tokai, Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Filed Mar. 24, 1976, Ser. No. 670,099
Claims priority, application Japan, Mar. 31, 1975, 50-38692
Int. Cl.² H03F *3/16*
U.S. Cl. 330—277 **3 Claims**

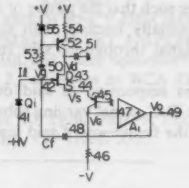
1. A self-feedback low-noise charge sensitive amplifier comprising

an input stage including a junction type field-effect transistor (FET) as the active element thereof, said FET having source, drain and gate terminals,

a transistor having an emitter electrode coupled to the source terminal of said FET, a base electrode connected to ground and a collector electrode,

an amplifier having an input terminal connected to the collector electrode of said transistor and an output terminal coupled to the gate terminal of said FET, and

a capacitor having one end grounded and the other end connected to the drain terminal of said FET, said capacitor stabilizing the gate potential of said FET and changing



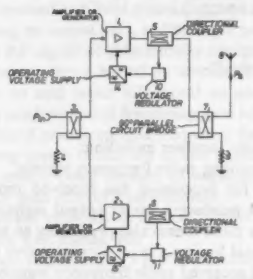
the drain terminal voltage of said FET in response to a change in the potential at the gate terminal of said FET.

4,053,848

CIRCUIT ARRANGEMENT FOR COMBINING HIGH FREQUENCY POWER COMPONENTS

Wilhelm Kleische, Berlin, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed May 3, 1976, Ser. No. 682,502
Claims priority, application Germany, May 3, 1975, 2519845
Int. Cl.² H03F *3/60, 3/30*
U.S. Cl. 330—53 **8 Claims**



1. In a circuit arrangement for combining high frequency power components with the same frequency including a pair of amplifiers or generators for providing high frequency power components with the same frequency at their respective outputs, a 90° parallel circuit bridge having its output connected to a load and two substantially decoupled inputs, each of which is coupled to the output of a respective one of said pair of amplifiers or generators with the input resistance values of said inputs depending on said output load; the improvement comprising: a separately controlled operating voltage supply of each of said amplifiers or generators; and means for controlling said operating voltage supplies so that the output power of each of said amplifiers or generators remain substantially constant even with mismatching.

4,053,849

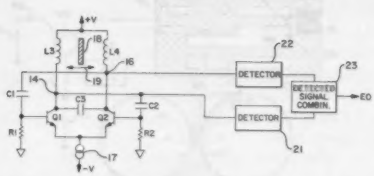
OSCILLATION MEANS FOR GENERATING A DIFFERENTIAL AC SIGNAL PROPORTIONAL TO MOVEMENT OF A CONDUCTING MEMBER

Gerald S. Bower, Templeton, and Scott F. Voelker, Lafayette, both of Calif., assignors to Systron Donner Corporation, Concord, Calif.

Filed Oct. 1, 1976, Ser. No. 728,854
Int. Cl.² G08C *21/00*
U.S. Cl. 331—65 **4 Claims**

1. An electrical oscillator for use in transducing mechanical motion to an electrical output comprising a resonant circuit having a predetermined resonant frequency, first and second

terminals on electrically opposed ends of said resonant circuit, first and second inductors mounted in spaced relation and connected in series within said resonant circuit, a capacitor within said resonant circuit connected in parallel with said first and second inductors, an electrically conductive member mounted between and disposed for differential motion relative to said first and second inductors, whereby motion toward one of said first and second inductors is away from the other of said



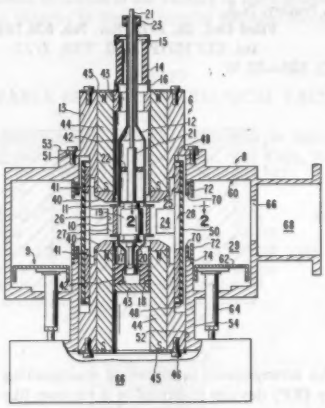
first and second inductors, first and second electronic switches operating to couple an electrical energy source alternately to said first and second terminals at a frequency substantially coincident with said predetermined resonant frequency, whereby the amplitude of said predetermined resonant frequency changes differentially at said first and second terminals with differential motion of said electrically conductive member.

4,053,850

MAGNETRON SLOT MODE ABSORBER

George Kenneth Farney, Boxford, and William Allen Gerard, Andover, both of Mass., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Sept. 23, 1976, Ser. No. 726,088
Int. Cl.² H03B 9/10
U.S. Cl. 331—91 **14 Claims**



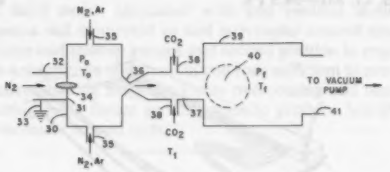
1. In an electronic oscillator:
circuit means adapted to interact with electrons at a selected frequency to generate electromagnetic energy,
cavity means adapted to resonate at said frequency,
a conductive wall forming a common part of the electrical boundaries of said circuit means and said cavity means,
at least one slot in said wall for coupling electromagnetic fields of said circuit means and said cavity means,
lossy material near said slot,
a conductive shield between said lossy material and the interior of said cavity means for shielding said lossy material from fields of said cavity means,
the portion of said shield near said slot being spaced from said wall by a distance larger than the width of said slot.

4,053,851

NEAR 16 MICRON CO_2 LASER SYSTEM

William F. Krupke, Pleasanton, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 10, 1975, Ser. No. 594,821
Int. Cl.² H01S 3/22
U.S. Cl. 331—94.5 G **19 Claims**



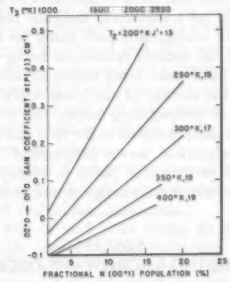
1. A method for inducing laser action in CO_2 contained in an optical resonant cavity at a wavelength of near 16 microns involving the transition between the $02^{0}0$ and $01^{1}0$ energy levels comprising the steps of: pumping the CO_2 to the $00^{0}1$ energy level, suppressing the 10.6 micron transition to the $10^{0}0$ energy level while encouraging the 9.6 micron transition thereby populating the $02^{0}0$ energy level, and allowing the thus populated $02^{0}0$ energy level to decay to the $01^{1}0$ energy level causing laser action at a wavelength of near 16 microns.

4,053,852

METHOD AND APPARATUS FOR GENERATING COHERENT NEAR 14 AND NEAR 16 MICRON RADIATION

William F. Krupke, Pleasanton, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 10, 1975, Ser. No. 594,822
Int. Cl.² H01S 3/22
U.S. Cl. 331—94.5 G **8 Claims**



1. A method for producing coherent radiation in CO_2 vibrational-rotational transitions at wavelengths near 14 and near 16 microns composed of the steps of: passing a gaseous mixture of N_2 and Ar through a glow discharge region producing a high vibrational temperature in the N_2 while maintaining a relatively low gas temperature, passing the mixture through a nozzle bank causing a flow thereof at supersonic speed, injecting precooled CO_2 into the supersonic flow creating an interaction zone wherein the precooled CO_2 mixes with the translationally cooled N_2 — Ar mixture causing pumping of the CO_2, and directing a saturating pulse of radiation selected from the group consisting of near 10.6 microns and near 9.6 microns through the interaction zone creating a population inversion and thereby producing a gain in the near 14 micron wavelength when the saturating pulse of radiation is near 10.6 mi-

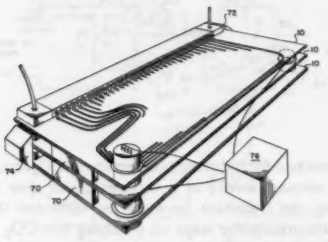
crons and in the near 16 micron wavelength when the saturating pulse of radiation is near 96 microns.

4,053,853

REPETITIVELY PULSABLE TRAVELING WAVE LASER

Carl B. Collins, Jr., 1214 Cloverdale, Richardson, Tex. 75080

Filed Aug. 18, 1975, Ser. No. 605,410
Int. Cl.[2] H01S 3/097
U.S. Cl. 331—94.5 PE 8 Claims



1. A traveling wave laser comprising

a discharge channel containing a laser medium having a wave initiating end and an output end;

electrical pulse generating means for repetitively producing a localized elecrical pulse;

a plurality of discrete pulse transmission lines of progressively greater lengths coupling the pulse generating means to the discharge channel at spaced points extending from the initiating end to the output end for sequentially applying each pulse to the points along the discharge channel in advance of a coherent electromagnetic wave propagating through the discharge channel from the initiating end to the output end; and,

each of the discrete pulse transmission lines including a first conductor, a second conductor, and a third conductor, the first and second conductors being separated by a first layer of a dielectric medium thereby defining a first wave propagation path along the first and second conductors, and the second and third conductors being separted by a second layer of a dielectric medium thereby defining a second wave propagation path along the second and third conductors, the second conductor being electrically coupled to the pulse generating means to receive an electrical charge for the storage of electrical energy in the first and second wave propagating paths, the discharge channel being electrically coupled to the first and third conductors to receive electrical waves propagated through the first and second propagation paths in response to an abrupt discharge of electrical energy stored therein.

4,053,854

Q SWITCHING MICROWAVE OSCILLATOR

Richard Calvin Havens, Scottsdale, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Filed June 7, 1976, Ser. No. 693,824
Int. Cl.[2] H03B 7/14
U.S. Cl. 331—101 14 Claims

1. A microwave Q switching oscillator comprising:

a. a transmission line;

b. a negative impedance device connected at one end of said transmission line for terminating said transmission line in a negative impedance and generating RF energy at a desired frequency;

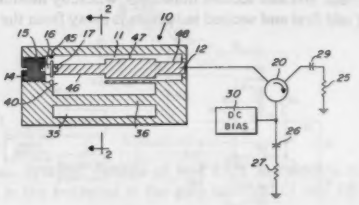
c. the opposite end of said transmission line forming an output for generated pulses of RF energy;

d. a cavity tuned to be resonant at the desired frequency and capable of storing a predetermined amount of RF energy;

e. coupling means for coupling RF energy at the desired frequency between said transmission line and said cavity;

f. means coupled to the negative impedance device for receiving thereon a bias normally at a first level and periodically changed to a second level.

g. susceptance means cooperating with said negative impedance device to tune said device to an antiresonant mode of operation when the second level of bias is applied thereto; and



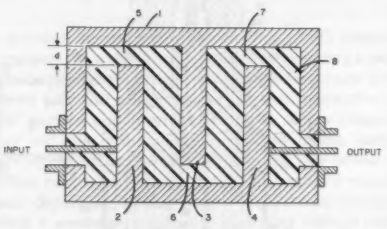
h. said negative impedance device operating in a resonant mode when the bias is at the first level to cause RF energy to be stored in said resonant cavity and operating in the antiresonant mode when the second level of bias is applied to change the Q of said resonant cavity and allow RF energy to flow from said resonant cavity to the output of said transmission line at a different rate than that at which it was stored.

4,053,855

METHOD AND ARRANGEMENT TO ELIMINATE MULTIPACTING IN RF DEVICES

Aare Kivi, Massapequa, N.Y., and Louis Feit, Fairlawn, N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Oct. 28, 1975, Ser. No. 626,161
Int. Cl.[2] H01P 1/20, 7/06, 3/12
U.S. Cl. 333—73 W 4 Claims



1. An arrangement to eliminate multipacting in radio frequency (RF) devices disposed in a vacuum-like environment comprising:

a RF device disposed in said environment, said device having two RF electrodes capable of supporting multipacting in a RF high voltage region therebetween; and

a dielectric material having a given dielectric constant and a given dielectric strength disposed between said two electrodes in at least said region to eliminate multipacting, said dielectric material completely filling said region;

said environment is space; and

said RF device including

a microwave filter having a cavity with a cavity wall providing one of said two electrodes and a plurality of resonators providing the other of said two electrodes; and

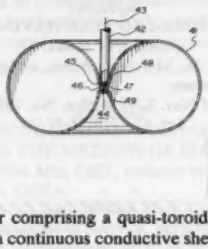
said dielectric material fills said cavity.

4,053,856

QUASI-TOROIDAL INDUCTOR AND RESONATOR

Sidney T. Fisher, 53 Morrison Ave., and Charles B. Fisher, 2850 Hill Park Road, both of Montreal, Quebec, Canada

Filed Feb. 3, 1976, Ser. No. 654,801
Int. Cl.[2] H01P 7/00; H03H 7/04
U.S. Cl. 333—82 R 4 Claims



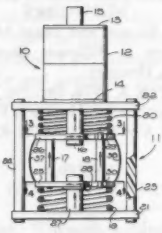
1. A resonator comprising a quasi-toroidal inductive envelope formed by a continuous conductive shell having a discontinuity in the surface near the axis thereof, the discontinuity being small in comparison with the perimeter of the shell taken along a cross-section through the axis of the quasi-toroidal envelope, a first terminal in the form of a cylinder of small radius compared with the dimensions of the shell concentric with the axis of the shell and extending axially away from and connected to one side of the discontinuity, a second terminal in the form of a conductor lying generally along the axis of the shell electrically connected to and extending axially from the other side of said discontinuity to the interior of said cylinder and insulated therefrom, thereby to form a co-axial cable termination for said resonator, and a capacitor formed between the first and second terminals in the vicinity of the discontinuity of said surface, thereby to form a parallel resonant circuit.

4,053,857

RESETTABLE ELECTRO-MECHANICAL VACUUM FUSE

Orhan A. Guraydin, San Jose, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed June 7, 1976, Ser. No. 693,287
Int. Cl.[2] H01H 9/30
U.S. Cl. 335—147 10 Claims



1. An electro-mechanical device for interrupting at least one electric circuit whenever the current carried by said circuit substantially exceeds a predetermined value, comprising:

a vacuum interrupter having at least one pair of contacts and a control shaft, said contacts providing circuit continuity in response to a first position of said control shaft, and said contacts separating to interrupt said circuit in response to a second position of said control shaft;

first means external to said vacuum interrupter and including at least a pair of generally parallel conductive rods arranged in said circuit to divide most of the current in said circuit between the rods of said pair;

second means including resilient mounting means for holding said rods in place by application of longitudinal pressure thereon, said rods being displaceable, at least at one displacement point along the length thereof, by application of a laterally acting force sufficient to overcome the laterally acting static forces extant at said displacement point;

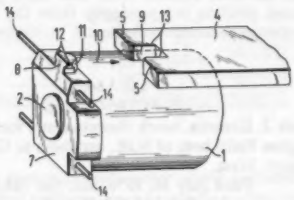
and third means associated with said resilient mounting means and connected to said interrupter control shaft to cause said shaft to assume said second position in response to a magnitude of current in said rods sufficient to produce corresponding magnetic forces overcoming said laterally acting static forces and therefore to produce lateral displacement of said rods.

4,053,858

MAGNET SYSTEM FOR AN ELECTROMAGNETIC RELAY

Martin Aidn, Degerndorf, and Eberhard Wanka, Dachau, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 12, 1975, Ser. No. 631,081
Claims priority, application Germany, Nov. 20, 1974, 2455018
Int. Cl.[2] H01F 7/14
U.S. Cl. 335—276 5 Claims



1. An electromagnetic relay having a coil body with an elongated magnetizable core extending axially therethrough from a rear end press-fittingly engaging a first end of an angled, magnetizable yoke to a front end adjacent a pivotable armature, said yoke having a second end extending to a point spaced adjacent said front end of said core and receiving said armature pivotally thereon, and said coil body having a non-magnetizable coil flange affixed about said coil axially adjacent said front end of said core, and wherein:

said coil flange has a projection formed thereon extending laterally of said coil body into a position engageable with said second end of said yoke; and

said second end of said yoke forms an aperture sized for press-fittingly receiving said projection therein upon assembly of said yoke to said core and coil body.

4,053,859

TEMPERATURE SENSITIVE SWITCH

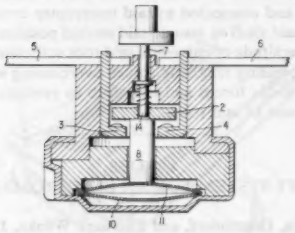
Walter Hollweck, Nurnberg, Germany, assignor to INTER CONTROL, Herman Kohler Elektrik GmbH & Co KG, Nurnberg, Germany

Filed Sept. 28, 1976, Ser. No. 727,519
Claims priority, application Germany, Oct. 3, 1975, 2544201
Int. Cl.[2] H01H 61/00
U.S. Cl. 337—91 10 Claims

1. In a temperature sensitive switch including a movably supported electric contact having a closed and an open position, a temperature sensitive element coupled to the movable contact and being arranged for displacement from a first position to a second position at a predetermined maximum temperature; the temperature sensitive element being further arranged to move the movable contact from the closed position into the

open position upon motion of the temperature sensitive element from the first position into the second position; the improvement comprising

a. a bistable element having first and second positions and being coupled to said temperature sensitive element and said movable contact; said bistable element being arranged for movement from is first position into its second position by said temperature sensitive element when said temperature sensitive element moves from its first position into its



second position; said bistable element being arranged for maintaining, in its second position, said movable contact in said open position independently from the position of said temperature sensitive element; and

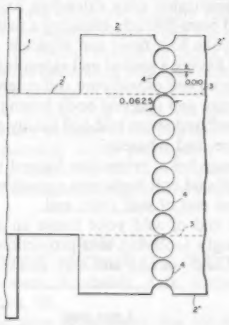
b. resetting means for simultaneously moving said bistable element from its second position into its first position and said movable contact from said open position to said closed position independently from the position of said temperature sensitive element.

4,053,860

ELECTRIC FUSE

Frederick J. Kozacka, South Hampton, and Richard A. Belcher, Hampton Falls, both of N.H., assignors to Gould, Inc., Newburyport, Mass.

Filed July 14, 1976, Ser. No. 705,038
Int. Cl.² H01H *85/04*
U.S. Cl. 337—164 **7 Claims**



1. An electric fuse including

a. a pair of parallel connected fusible elements each having a pair of parallel center portions and lateral portions enclosing acute angles with said center portions;

b. said center portions having sides affixed to a pair of blade contacts while said lateral portions are non-connected to said pair of blade contacts;

c. a casing housing said pair of fusible elements and a granular arc-quenching filler inside said casing embedding said pair of fusible elements;

d. overlays of a metal having a lower fusing point than the metal of which said pair of elements are made arranged on said pair of fusible elements to cause interruption of said pair of fusible elements at temperatures below the fusing point of the metal of which said pair of fusible elements are made; and

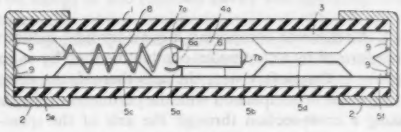
e. a plurality of transverse lines of circular perforations in each of said pair of fusible elements, said lines of perforations from edge to edge of each of said pair of fusible elements and the ratio of the diameter of said perforations to the solid metal current paths therebetween being in the order of 6:1, and the cross-sectional area of each said solid metal current paths being in the order of 0.00005 to 0.000075 inch.

4,053,861

ELECTRIC TIME-LAG FUSE HAVING A SMALL CURRENT RATING

Edward J. Knapp, Jr., Merrimac, Mass., assignor to Gould, Inc., Newburyport, Mass.

Filed Nov. 8, 1976, Ser. No. 739,955
Int. Cl.² H01H *71/20*
U.S. Cl. 337—165 **4 Claims**



1. An electric time lag fuse including

a. an elongated metal clad strip of electric insulating material wherein the metal layer is removed from the center region of the strip to define an insulating gap, wherein the axially outer regions of said metal layer immediately adjacent said gap are of relatively large width and the axially outer regions of said metal layer more remote from said gap are relatively narrow width;

b. a shorting strip of sheet metal conductively interconnecting said axially outer regions of said metal layer immediately adjacent said gap;

c. a pair of soft solder joints effecting said conductive connection; and

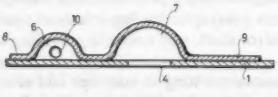
d. a helical spring having one end attached to said shorting strip to bias said shorting strip to a circuit-open position thereof involving a pair of series breaks, said helical spring being normally shunted by one of said axially outer regions of said metal layer.

4,053,862

FUSE-ELEMENT FOR FUSES USED IN ELECTRIC NETWORKS

Tibor Csizy; Arpad Karpat, and Janos Melis, all of Budapest, Hungary, assignors to Villamos Berendezes es Keszulek Muvek, Budapest, Hungary

Filed Feb. 5, 1976, Ser. No. 655,492
Claims priority, application Hungary, Feb. 10, 1975, VI 1027
Int. Cl.² H01H *85/02, 85/46*
U.S. Cl. 337—221 **6 Claims**



1. A fuse-element for use in an electric network, comprising, in combination:

a metal strip including at least one portion having a reduced cross-section;

a shunt element of conductive material shunting said portion

bonding means conductively bonding said shunt element to said metal strip and being capable of being released at a temperature higher than a predetermined temperature;

said shunt element defining a chamber facing towards said metal strip and being sealed by said bonding means between said metal strip and said shunt element; and

a material disposed in said chamber having a boiling temperature below said predetermined temperature and capable of producing an internal gas pressure within said chamber sufficient to break said bond when said material is heated to a temperature higher than said boiling temperature.

4,053,863

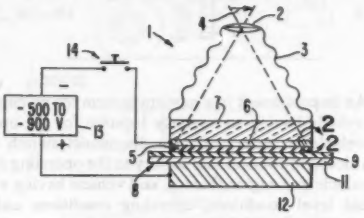
ELECTROPHOTOGRAPHIC PHOTOCONDUCTIVE PLATE AND THE METHOD OF MAKING SAME

Guy A. Marlor, Palo Alto, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 149,821, June 3, 1971, abandoned, which is a continuation of Ser. No. 721,331, April 15, 1968, abandoned. This application July 17, 1972, Ser. No. 272,241

Int. Cl.² H01L *31/08*

U.S. Cl. 338—15 **29 Claims**



1. An electrophotographic plate which is capable of forming a charge image pattern in response to and in correspondence with a photon image comprising:

a photoconductive layer comprising electrically connected photoconductive particles of crystalline material bound together by glass disposed in interstices between the particles;

the glass comprising less than 40% by weight of the total material of the layer;

the photoconductive particles being selected from the group consisting of sulphides, tellurides, selenides and sulphoselenides of a material selected from the group consisting of zinc and cadmium, and containing activator proportions of a halide and activator proportions of a metal selected from the group consisting of copper and silver.

4,053,864

THERMISTOR WITH LEADS AND METHOD OF MAKING

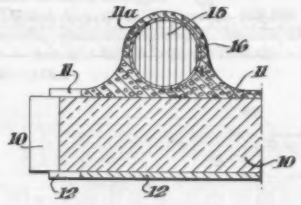
George H. Rodriguez, Williamstown, and John P. Maher, Adams, both of Mass., assignors to Sprague Electric Company, North Adams, Mass.

Filed Dec. 20, 1976, Ser. No. 752,584

Int. Cl.² H01C *7/02*

U.S. Cl. 338—22 SD **14 Claims**

1. A thermistor having a fatigue resistant lead joint comprising a PTCR titanate ceramic body; at least one electrode being bonded to and making ohmic contact with one surface region of said body; a base-metal lead having a portion thereof being bonded by and completely embedded within said one electrode; and another electrode being in contact with another surface region of said body, said one electrode being comprised of aluminum particles that are bound by a matrix of a



lead-aluminoborate glass, said glass amounting to from 20 to 60% by weight of the sum of said glass and said aluminum.

4,053,865

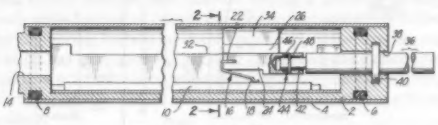
LINEAR MOTION COUPLING

Milton Reese Brown, Jr., Riverside, Calif., assignor to Bourns, Inc., Riverside, Calif.

Filed Apr. 22, 1976, Ser. No. 679,114

Int. Cl.² H01C *10/40*

U.S. Cl. 338—180 **7 Claims**



1. In a linear motion potentiometer which includes a housing, resistance and collector tracks extending along the inside of said housing, a contact spring electrically and mechanically bridging said resistance and collector tracks, and a drive shaft extending inwardly into said housing for moving said contact spring in longitudinal, reciprocable wiping contact along said resistance and collector tracks, wherein the improvement comprises low backlash means for coupling said drive shaft to said contact spring, said means comprising:

a mounting means for said contact spring, said mounting means including a bore for receiving said drive shaft and a slot transversely intersecting said bore for receiving an O-ring, said O-ring being positioned in said slot encircling said drive shaft and said O-ring being formed from a stiffly deformable, springy material and coupling said drive shaft to said mounting means so as to absorb transverse and angular movements of said drive shaft and transmit to said mounting means longitudinal drive shaft movement.

4,053,866

ELECTRICAL RESISTOR WITH NOVEL TERMINATION AND METHOD OF MAKING SAME

Kenneth M. Merz, Gladwyne, and Howard E. Shapiro, Philadelphia, both of Pa., assignors to TRW Inc., Cleveland, Ohio

Filed Nov. 24, 1975, Ser. No. 634,481

Int. Cl.² H01C *1/012*

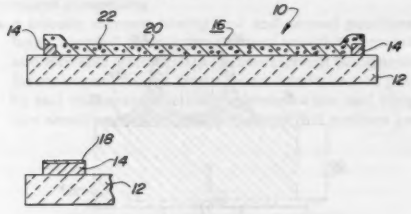
U.S. Cl. 338—309 **24 Claims**

1. An electrical resistor comprising

a substrate of an electrical insulating material,

a termination on and directly adhering to said substrate, said termination being a conductive material selected from the

group consisting of molybdenum, tungsten and mixtures of molydenum and tungsten, and



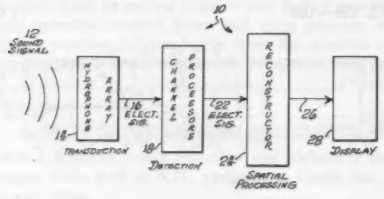
a resistance material film on said substrate and contacting the termination.

4,053,867

ACOUSTIC HOLOGRAM RECONSTRUCTOR USING SURFACE ACOUSTIC WAVE DEVICES

Newell O. Booth, and Ralph D. Hippenstiel, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 22, 1975, Ser. No. 643,454
Int. Cl.² G01S 9/66
U.S. Cl. 340—5 H **3 Claims**



1. A hologram reconstructor, which is part of a system for converting an acoustical hologram developed from a square acoustic image comprising N^2 elements, into a focused optical image, the square having a side of length L, comprising:

means for accepting a stream of electrical input data, A cos ϕ and A sin ϕ developed from the acoustic image, A being an amplitude and ϕ being a phase angle, both being a function of Z, the distance from a point acoustic source to the plane of N^2 transducers located in an array perpendicular to Z, one output of this means being the discrete signal $U_A(nl,ml)$, where $m=n=0,1,2,\ldots,N-1$, $l=(L/N)$ = the spacing between the hydrophones, another output of the means being the quantity Z;

a memory, connected to and which receives the $U_A(nl,ml)$, signal from, said input data means, which stores the N^2 discrete values of the signal $U_A(nl,ml)$;

means, connected to said memory, for controlling the movement of the stream of electrical input data;

a first function generator, whose input is connected to said input data means and said controlling means which generates the signals cos $\alpha\, n^2$ and sin $\alpha\, n^2$, the term α including a focusing term for the Z dimension of the planar array, which corrects for near-field phase curvature;

a second function generator for generating the two functions sin $(\pi/N)\, k^2$ and cos $(\pi/N)\, k^2$;

a pair of convolvers, whose inputs are connected to the outputs of said controlling means and said two function generators, which convolve the input signals, said controlling means causing a row-by-row flow of a continuous stream of Fourier coefficients from said two convolvers, which coefficients are written back into said memory, read out column-by-column, and fed back into said convolvers, to be transformed into two-dimensional Fourier transform coefficients; and

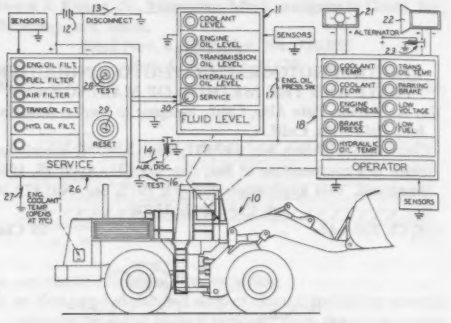
a squaring and summing circuit, whose input is connected to the output of said controlling means, which accepts the Fourier transformed coefficients from said two convolvers, where they are converted into N^2 intensity signals in a square array of N rows and N columns.

4,053,868

VEHICLE SYSTEM MONITOR

Harrison F. Cox, East Peoria; Thomas E. Cochran, Yorkville; Lawrence F. Fratzke, East Peoria, and Joe E. Fuzzell, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 27, 1976, Ser. No. 754,816
Int. Cl.² G08B 19/00
U.S. Cl. 340—52 F **16 Claims**



1. An improvement in a monitor system for an engine-powered vehicle having an operator location for the operator of said vehicle, a battery, a main disconnect switch arranged when closed to connect said battery to the operating circuits of said vehicle and engine thereof, said vehicle having a plurality of fluid level conditions, operating conditions and service conditions, said vehicle having a condition-responsive means associated with each of said conditions, each condition-responsive means being operable to signal the existence of an undesirable state in the condition with which it is associated, the improvement comprising:

a. first, second and third indicator panels mounted on said vehicle, at least said second panel being disposed at said operator location,

b. said first panel having a plurality of visually observable indicators each associated with a different fluid-level-condition-responsive means, said first panel including means operable when said first panel is energized to individually energize said first panel indicators in response to an undesirable-state operation of the fluid-level-condition-responsive means associated therewith,

c. means connecting said first panel to said battery for energization of said first panel from said battery during at least a portion of the time said main disconnect switch is closed,

d. means responsive to an engine-operating condition for inhibiting energization of said first panel indicators during operation of said engine,

e. said second panel having a plurality of visually observable indicators each associated with a different operating-condition-responsive means, said second panel including means operable when said second panel is energized to individually energize said second panel indicators in response to an undesirable-state operation of the operating-condition-responsive means associated therewith,

f. means for connecting said second panel to said battery for energization of said second panel from said battery during the time said main disconnect switch is closed,

g. said third panel having a plurality of visually observable indicators each associated with a different service-condition-responsive means, said third panel including means

operable when said third panel is energized to individually energize said third panel indicators in response to an undesirable-state operation of the service-condition-responsive means associated therewith and for latching energized indicators in an energized state, said third panel further including manually operable reset means for unlatching energized indicators,

h. means for connecting said third panel directly across said battery for energization of said third panel from said battery irrespective of whether said main disconnect switch is open or closed,

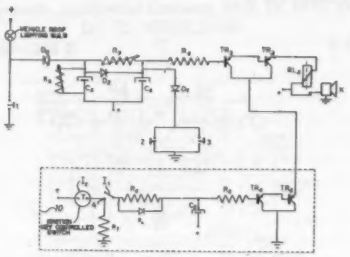
i. means responsive to an engine-operating condition for inhibiting energization of any of said third panel indicators by said service-condition-responsive means during the time when said engine is not in operation.

4,053,869

BURGLAR ALARM SYSTEM

Charles Quercia, 20 rue Victor Dumay, 21000 Dijon, France

Filed May 12, 1976, Ser. No. 685,614
Claims priority, application France, May 14, 1975, 75.15574
Int. Cl.[2] B60R *25/10*
U.S. Cl. 340—64 **4 Claims**



1. An alarm system for use in a vehicle to detect unauthorized entry into the vehicle, comprising:

A. a first switch means positioned to be operated when a door of the vehicle is opened,

B. a key-operated switch means having at least first and second switch conditions, normally being in the first condition when the vehicle is empty, and adapted to be placed in the second condition by insertion and operation of a key,

C. a two-position switch means which is manually operable between first and second switch positions,

D. alarm means for giving an alarm when operated,

E. disabling means operative only when the key-operated switch is in the second condition and responsive to placement of the two-position switch in the second switch position for disabling the alarm system,

F. first delay means, operative only when the two-position switch is in the first switch position, and responsive to the act of placing the key-operated switch in the first condition, for beginning to measure a first delay interval,

G. second delay means, fully operative only after the first delay interval has been measured to its conclusion, and responsive to operation of the first switch means, for beginning to measure a second delay interval, and

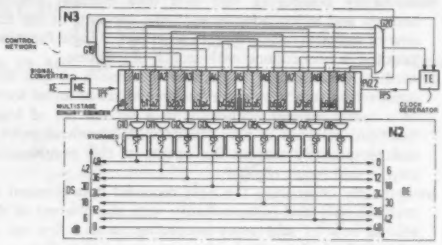
H. third delay means, operative unless and until inhibited by placement of the key-operated switch means in the second condition, for defining a third delay interval during which the alarm means is operated.

4,053,870

DIGITAL SIGNAL LEVEL COMPARISON DEVICE

Werner Noé, Planegg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 25, 1975, Ser. No. 607,590
Claims priority, application Germany, Aug. 23, 1974, 2440604
Int. Cl.[2] G06F *7/02*; H01P *1/22*
U.S. Cl. 340—146.2 **3 Claims**



1. In a digital level comparison device having a binary counter, a switching network responsive thereto for adding and removing attenuation from a signal channel, an input to said binary counter for receiving an output from said signal channel and a clock generator producing clock pulses corresponding to a predetermined nominal signal level coupled to said binary counter, said counter having a plurality of stages, each stage having an output coupled to said switching network for delivering thereto an output signal when the counter registration has advanced to that stage, each said stage corresponding to a predetermined attenuation interval thereby forming a plurality of attenuation interval stages, the improvement comprising:

first and second additional attenuation interval stages forming portions of said attenuation intervals, each attenuation interval corresponding to a said counter stage, and arranged such that advancement of said counter to said first additional interval will cause reduction of said predetermined nominal signal level by a given value and advancement of said counter to said second additional interval will increase said nominal signal level by a given value and

means connecting said first and second additional interval stages to said clock generator for altering the output thereof in accordance with the counter registration.

4,053,871

METHOD AND SYSTEM FOR THE ITERATIVE AND SIMULTANEOUS COMPARISON OF DATA WITH A GROUP OF REFERENCE DATA ITEMS

Jacques M. Vidalin, Bordeaux; Jean F. Suchard, and Hong H. Quang, both of Paris, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Filed Dec. 4, 1975, Ser. No. 637,659
Claims priority, application France, Dec. 4, 1974, 74.39592
Int. Cl.[2] G06F *7/20*; G11C *15/00*
U.S. Cl. 340—146.2 **30 Claims**

1. A method for selectively retrieving items of data in accordance with search objectives from an extensive collection of data to be searched available from any data source able to transmit said data to be searched in a substantially continuous sequential flow of data containing logical entities each made up of a sequence of data elements of any one predetermined size beginning with a data element recognizable in said flow as the first element of a logical entity and ending with a data element recognizable in said flow as the last element of a logical entity, comprising for the basic search process the steps of:

selecting in accordance with search objectives, as reference data items, a plurality of reference logical entities made up of a sequence of data elements of said predetermined size;

storing said plurality of reference logical entities in a two dimensional array with one logical entity in each column, each row containing data elements of the same sequential rank of the respective reference logical entities;

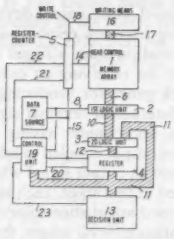
electrically receiving sequentially said data elements constituting said flow of data transmitted as aforesaid by a data source from said collection of data to be searched;

detecting the first data element of the first received logical entity;

immediately comparing said first data element simultaneously and independently with the contents of the first row of said array according to a first set of logic functions selected in accordance with search objectives;

immediately combining in parallel the results of that first comparison step with a predetermined set of initial states of a result register according to a second set of logic functions selected in accordance with search objectives and temporarily storing the results of this combination step in said result register;

immediately comparing the next received data element simultaneously and independently with the content of the second row of said array according to said first set of selected logic functions;



immediately combining in parallel the results of that second comparison step with said temporarily stored results of the first combination step according to said second set of selected logic functions and temporarily storing the results of this second combination step in place of said first stored results in said result register;

proceeding with this alternation of comparison and combination steps up to and including either the comparison and combination steps following detection of the last data element of said first received logical element or the comparison step utilizing the last row of said table and the following combination step, whichever occurs first;

providing the results of the last combination step as the result of the foregoing iterative and simultaneous basic search processing of said first received logical entity with reference to said plurality of reference logical entities, and then

proceeding according to the same basic search process above set forth following the first-mentioned storage step for processing the further received logical entities beginning in each case with detection of the first data element thereof.

4,053,872

THERMOPLASTIC OPTICAL RECORDING MEDIUM USING IR WAVE LENGTH

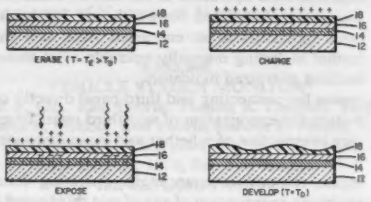
Roger Wayne Honebrink; Leslie Harold Johnson, and David Shih-Fang Lo, all of St. Paul, Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,241
Int. Cl.[2] G11C *11/46*; G01D *15/02*
U.S. Cl. 340—173 TP **4 Claims**

1. An integral, laminated medium for the optical recording of data in a thermoplastic film, comprising:

a planar, dimensionally stable substrate;

a layer of conductive material affixed to and continuous over the top surface of said layer of conductive material and which is only optically responsive to light that is of a wavelength that is below the IR range; and,



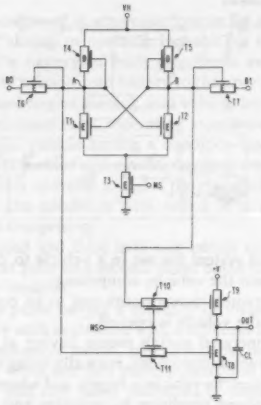
a layer of thermoplastic material affixed to and continuous over the top surface of said layer of photoconductive material and which is only thermally responsive to light that is of a wavelength that is in the IR range.

4,053,873

SELF-ISOLATING CROSS-COUPLED SENSE AMPLIFIER LATCH CIRCUIT

Leo Boyes Freeman; Robert James Incerto, both of Poughkeepsie, and Joseph Anthony Petrosky, Jr., Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1976, Ser. No. 701,067
Int. Cl.[2] G11C *11/40*
U.S. Cl. 340—173 R **48 Claims**



1. In an electronic memory system, a sense amplifier latching circuit comprising:

first and second sources of potential;

first and second input nodes;

first and second output nodes;

first and second transistors, each having first and second controlled electrodes and a control electrode, said first controlled electrodes being electrically connected, said second controlled electrode of said first transistor being electrically connected to the control electrode of said second transistor, said second controlled electrode of said second transistor being electrically connected to the control electrode of said first transistor;

said first output node being in electrical contact with said electrical connection between the second controlled electrode of said first transistor and the control electrode of said second transistor;

said second output node being in electrical contact with said electrical connection between said second controlled

electrode of said second transistor and the control electrode of said first transistor;

a first unidirectionally conducting means electrically connected between said first source of potential and said first output node;

a second unidirectionally conducting means electrically connected between said first source of potential and said second output node;

a third unidirectionally conducting means electrically connected between said first input node and said first output node;

a fourth unidirectionally conducting means electrically connected between said second input node and said second output node; and

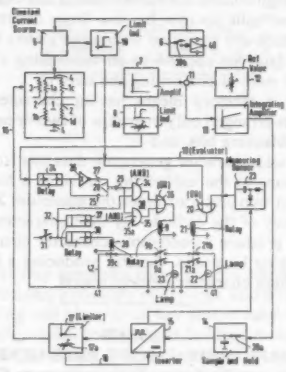
a third transistor having first and second controlled electrodes and a control electrode, the first controlled electrode of said third transistor being electrically connected to said second source of potential, the second controlled electrode of said third transistor being in electrical contact with said electrical connection between the first controlled electrodes of said first and second transistors, the control electrodes of said third transistor being electrically connected to a third source of potential.

4,053,874

APPARATUS FOR MONITORING THE LIQUID LEVEL IN A TANK

Helmut Glaser, Forchheim, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 26, 1976, Ser. No. 661,428
Claims priority, application Germany, Mar. 10, 1975, 2510356
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—244 R **9 Claims**



1. In apparatus for monitoring the liquid level in a tank, which includes a resistance bridge supplied with DC current having two bridge arms arranged inside the tank with one of these bridge arms electrically heated, an output signal stage with an output indication in the form of a binary level, and a current regulator for the heating current of the heated bridge arm having the output of the resistance bridge as a control input, said apparatus including means for testing the operation of the monitoring device by simulating a given filling level, an improved means for testing comprising:

a. a constant current source for supplying at least two DC currents of different magnitude;

b. means for initiating testing;

c. a switching device, having its control input coupled to said means for initiating testing, for selectively coupling one of the two currents of different magnitude to the resistance bridge;

d. an analog value storage device interposed between the current regulator and the bridge; and

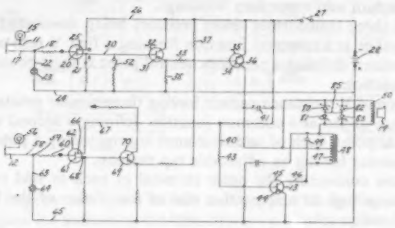
e. means responsive to said means for initiating testing for interrupting the connection between the output of the resistance bridge and the current regulator when the testing device is operated.

4,053,875

STATIC CHARGE DETECTOR HAVING FAIL-SAFE VOLTAGE SURGE PROTECTION MEANS

Julius B. Kupersmit, 145-80 228th St., Springfield Gardens,, N.Y. 11413

Filed Dec. 27, 1976, Ser. No. 754,548
Int. Cl.[2] H02H *1/04;* G08B *21/00*
U.S. Cl. 340—248 P **1 Claim**



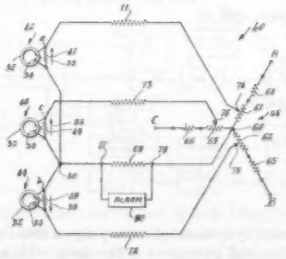
1. In a static charge detector including receptor means for detecting a signal, neon tube means for grounding a signal in excess of a predetermined voltage, a gating field effect transistor receiving a signal of voltage between predetermined limits below said predetermined voltage, an emitter follower connected to the emitter of said field effect transistor, a switching transistor controlled by said emitter follower, an oscillating transistor controlled by said switching transistor, a transformer receiving the output of said oscillating transistor, and an audible transducer receiving the output of said transformer, the improvement comprising: improved means for preventing excessive voltage surges as a result of failure of said transformer during use, said means comprising first and second pairs of Zener diodes, each connected in parallel with the output of said transformer, said pairs of transistors being mutually interconnected to provide multiple paths, to enable the same to function upon the simultaneous failure of not more than two of said Zener diodes.

4,053,876

ALARM SYSTEM FOR WARNING OF UNBALANCE OR FAILURE OF ONE OR MORE PHASES OF A MULTI-PHASE HIGH-CURRENT LOAD

Douglas E. Taylor, Bridgeport, Conn., assignor to Sidney Hoffman, Bridgeport, Conn.

Filed Apr. 8, 1976, Ser. No. 675,187
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—253 H **8 Claims**



1. An alarm system for warning of unbalance or failure of one phase of a three-phase load circuit having three power

leads running thereto and capable of being used with a high current flow in the load circuit comprising:

three similar magnetically permeable transformer cores each having an opening therein through which the perspective power lead is passed for defining a magnetically permeable path encircling each power lead,

three similar secondary transformer windings, one of said windings being positioned on each of said cores and passing through the opening thereof,

said secondary windings each having the same winding sense with respect to the power lead passing through the core on which the respective secondary winding is located,

three similar resistors,

one of said resistors being shunted across the terminals of each of said secondary windings,

said three transformer shunt resistors being connected together at a common junction forming a first Y resistance pattern defining a phantom neutral point at their common junction.

a second Y resistance pattern having three similar resistance legs joined at a common junction defining a second neutral point, each of said resistance legs including a potentiometer having an adjustable tap thereon,

means connecting the outer terminal of each of said resistance legs to a respective one of the phases of the load circuit,

three similar resistance elements each connected in circuit between one of the outer terminals of said transformer shunt resistors and one of said adjustable taps,

said resistance elements each being connected in circuit between the outer terminal of the secondary winding of the transformer which is associated with a particular phase of the load circuit and the tap of the potentiometer which is in the resistance leg that is connected to the same phase of the load circuit,

an unbalance sensing resistance element connected in circuit between said phantom neutral point and said second neutral point,

said potentiometers being adjustable for producing a null in voltage across said unbalance sensing resistance element when balanced three-phase current is flowing through the load circuit, and

alarm circuit means including alarm means for producing a warning signal when a voltage appears across said unbalance sensing resistance element.

4,053,877

METHOD OF AND APPARATUS FOR SURVEYING AN AREA

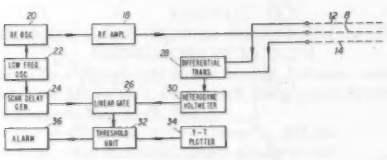
Arthur Timothy Torlesse, Chichester; Anthony Wulston Bovill, and Robert Charles West, both of Fareham, all of England, assignors to Plessey Handel und Investments AG, Zug, Switzerland

Filed Dec. 16, 1975, Ser. No. 641,358

Claims priority, application United Kingdom, Dec. 31, 1974, 56093/74

Int. Cl.² G08B *13/24*

U.S. Cl. 340—258 R **1 Claim**



1. A security system for surveying an area for the movement of unauthorized personnel in the area, which security system comprises in combination:

A. alarm means;

B. an extended length of a coaxial transmitter cable positioned beneath the surface of the area, the transmitter cable comprising means for emitting radio frequency signals with a low transmission loss along its length so that the transmitted radio frequency signals are substantially constant along the length of the cable, said means for emitting comprising means for emitting an amplitude modulated continuous signal;

C. a pair of coaxial receiver cables, each of extended length, positioned beneath the surface of the area and spaced apart equally on either side of the transmitter cable, each receiver cable comprising means for receiving the radio frequency signals from the transmitter cable by the radio frequency signals leaking into the receiver cables with substantially uniform strength along the length of the cable; and

D. receiver means for receiving signals received by the receiver cable when the radio frequency signals vary due to unauthorized personnel movement in the area, said receiver means including a differential transformer and means for connecting said receiver means to said alarm means.

4,053,878

METHOD AND APPARATUS FOR IMPROVING THE CLARITY AND CHARACTER DENSITY ON A DOT MATRIX VIDEO DISPLAY

Jack W. Cannon, Boca Raton, Fla., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,889

Int. Cl.² G06F *3/14*

U.S. Cl. 340—324 AD **10 Claims**

1. A method for improving the clarity and density of displayed characters in a cathode ray tube character display system in which the character format is formed by an M-wide row and N-high column coordinate matrix and characters to be displayed are built up row by row from discrete character elements which are identified within the matrix by character generating data bits applied to an unblanking circuit in the system, said method comprising the steps of

providing a memory means having character generating data bits arranged only in groups of two or more consecutive unblanking bits, and

applying said character generating data bits from the memory means to the unblanking circuit at a frequency rate between two and four times the maximum Z-modulation frequency of the cathode ray tube character display system to produce a continuous character element for each unblanking bit group, thereby producing a four wide by seven high character element matrix.

4,053,879

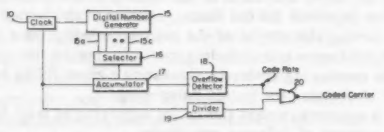
FAIL SAFE DIGITAL CODE RATE GENERATOR

Robert Anderson, Rochester, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed June 20, 1975, Ser. No. 588,567

Int. Cl.² G08C *19/28*

U.S. Cl. 340—351 **6 Claims**



1. A digital code rate generator with fail-safe attributes for generating a code rate, said digital code rate generator comprising:

clock means generating a continuous pulse train at a determined repetition rate,

first means, driven by said clock means pulse train for generating a digital representation of a multi-digit decimal

number, said digital representation comprising a single serial pulse stream of determined duration, said first means repetitively generating said representation, a representation generated in response to each clock pulse train segment

an accumulator having a numerical capacity and means connecting said accumulator to said first means, for summing, in said accumulator, the representations of said digital number passed by said connecting means,

an overflow detector operated by said accumulator when the sum of digital representations passed to said accumulator exceeds said accumulator numerical capacity, to produce a signal, continued operation of said clock means, first means, accumulator and overflow detector producing additional signals,

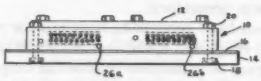
dividing means driven by said clock means,

a multi-input gate, one of said gate inputs connected to said overflow detector and another said input connected to said divider, whereby said overflow detector produces a timed series of signals corresponding to a code rate, and said gate produces an output comprising a modulated carrier, modulated at said code rate.

4,053,880
KEYING APPARATUS

John P. Harmon, PSC Box 1019, APO New York, N.Y. 09611

Filed Dec. 5, 1975, Ser. No. 638,212
Int. Cl.² G08C 9/08
U.S. Cl. 340—365 R 2 Claims



1. A code keying apparatus comprising in combination:

means for holding a plurality of key pins, said holding means maintaining said plurality of key pins in substantially parallel configuration to each said holding means allowing said plurality of key pins a degree of movement, said holding means comprising in combination,

a plurality of pin guide units having a plurality of pin guide holes drilled therein, said plurality of pin guide holes being aligned throughout said plurality of pin guide units, said plurality of pin guide units being arranged in parallel with respect to each other,

means for locking said plurality of key pins in a plurality of pin positions, said plurality of variable pin positions representing a predetermined code, said predetermined code being locked in place by said locking means, said locking means comprising in combination:

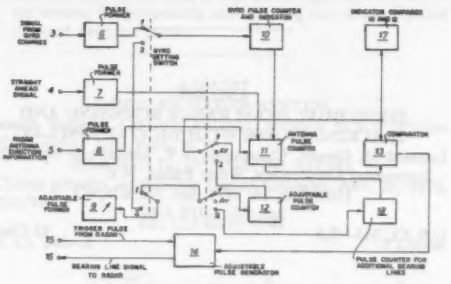
a plurality of pin locking bars having friction pads mounted thereto, said friction pads being utilized to contact and hold in place said plurality of key pins, said plurality of pin locking bars being fastened together and to said support base by a plurality of bolts and nuts, said plurality of pin locking bars being operatively fastened together so as to allow an increase or decrease of pressure upon said key pins, and

a support base having said holding means and said locking means mounted thereto.

4,053,881
MOBILE RADAR APPARATUS

David Dahl, Ski, Norway, assignor to Lehmkuhl A/S, Oslo, Norway

Filed Nov. 17, 1975, Ser. No. 632,716
Int. Cl.² G01S 7/22
U.S. Cl. 343—5 EM 4 Claims

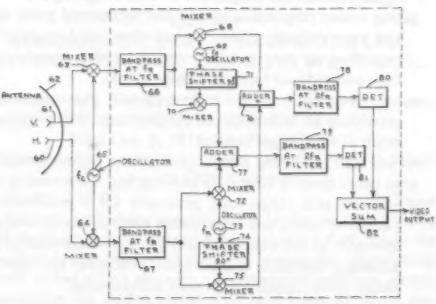


1. Improvement in a mobile radar apparatus having a gyro compass for indicating the true course on a radar screen, characterized in that information direction signals from a radar antenna (5) and a gyro compass (3) are converted in pulse formers (8 and 6 respectively) to pulses which are supplied to pulse counters (11 and 10 respectively) and that a third pulse counter (12) is adjustable to the desired counting value by means of pulses from an adjustable pulse generator (9), and that a pulse signal which represents the radar antenna straight-ahead-position causes the reading in of the counting value in the pulse counter (10) for the gyro compass in the pulse counter (11) for direction information signals and which continues counting until it reaches the counting value set in the third pulse counter (12), whereupon a pulse train is released which causes indication of a desired set bearing line on the radar screen.

4,053,882
POLARIZATION RADAR METHOD AND SYSTEM

Paul Van Etten, Clinton, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 23, 1976, Ser. No. 660,201
Int. Cl.² G01S 9/02
U.S. Cl. 343—5 SA 8 Claims



1. A polarization radar modulation system being comprised of means to generate a pulse waveform, means to rotate the polarization of said pulse waveform at a very fast and constant angular rate, said polarization rotation rate being at least 360° during one pulse, first antenna means to direct the rotated pulse waveform toward a target of interest for reflection therefrom,

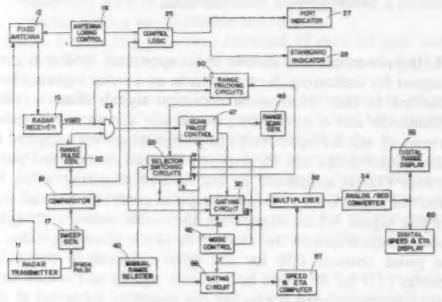
second antenna means to receive the energy of the reflected signal, said received energy having the same polarization as the transmitted polarization and both rotating at a constant linear rate, a receiver connected to said second antenna means, said received signals containing frequency components other than transmitted and said receiver being tuned thereto to obtain target discrimination.

4,053,883

FIXED DUAL BEAM RANGE SCANNING AND TRACKING RADAR WITH DIGITAL DISPLAY

Leonard M. Greene, Chappaqua, N.Y., assignor to Safe Flight Instrument Corporation, White Plains, N.Y.

Filed Apr. 14, 1976, Ser. No. 676,982
Int. Cl.² G01S 9/02
U.S. Cl. 343—7.3 **15 Claims**



1. In a radar system having a transmitter for transmitting pulsed signals in a fixed beam and a receiver for receiving echoes from targets in the path of said signals and converting said echoes to video signals,

means responsive to said transmitter for generating a repetitive linear sawtooth sweep signal synchronized with said pulsed signals, the magnitude of said sweep signal representing instantaneous radar range,

means for generating an analog range signal having a magnitude representing range including a range scan generator,

means for comparing said sweep signal and said range signal and generating a range pulse signal when said sweep signal reaches the magnitude of said range signal,

gating means responsive to said last mentioned pulse signal and receiving the video signals from said receiver for providing an output whenever said video signals are in time coincidence with said pulse signal,

means responsive to the output of said gating means for providing an indication of the presence and relative azimuth of said target echoes,

means for converting the range signal to digital form,

scan pause control means for interrupting the scanning operation of said range scan generator for a predetermined period of time, said scan pause control means being responsive to the output of said gating means whereby the scanning operation is interrupted whenever the video and range pulse signals are in time coincidence,

gating means responsive to said scan pause control means interposed between the range scan generator and said means for converting the range signal to digital form for passing the range signal to said digital converting means only during the times the scanning operation is being interrupted, and

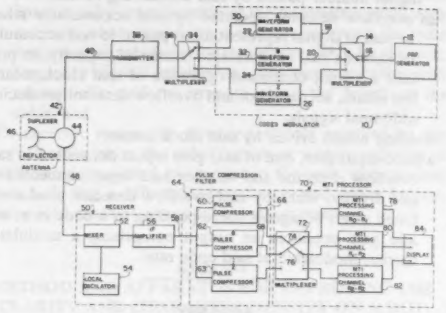
digital display means for displaying said digital range signal.

4,053,884

HIGH PRF UNAMBIGUOUS RANGE RADAR

Ben H. Cantrell, Springfield, Va., and Bernard L. Lewis, Oxon Hill, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 26, 1976, Ser. No. 670,816
Int. Cl.² G01S 7/28, 9/42
U.S. Cl. 343—7.7 **3 Claims**



1. In a pulse-compression MTI doppler radar system including an antenna, a coded modulator having at least two waveform generators for generating coded pulses having low cross-correlation, a transmitter, a receiver, and a display, the improvements comprising:

a pulse-compression filter, connected to receive the output of said receiver, having at least two pulse compressors for providing pulse-compressed signals, each pulse compresor matched autocorrelatively to a different one of said waveform generators;

at least two MTI processing channels for providing unambiguous range and speed indications to said display; and

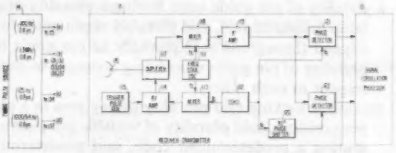
a multiplexer connected to receive the outputs of said pulse compressors for directing said pulse-compressed outputs to said MTI processing channels.

4,053,885

MOVING TARGET INDICATION RADAR

Yuichi Tomita; Takeru Irabu, and Eiichi Kiuchi, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Apr. 5, 1976, Ser. No. 673,323
Claims priority, application Japan, Apr. 3, 1976, 51-40628; Mar. 29, 1976, 51-34959
Int. Cl.² G01S 9/42
U.S. Cl. 343—7.7 **7 Claims**



1. A moving target indication radar comprising:

a. a radar signal analog processing portion including:

i. a constant-rate rotating antenna,

ii. means for transmitting at intervals through said antenna a microwave pulse of a predetermined frequency and width,

iii. means for receiving pulse returns from stationary and moving objects lying in the space scanned by said antenna, said pulse returns being received for every unit azimuthal region corresponding to one microwave

pulse in the form of a chain of unit data respectively for unit range region defined by the width of said microwave pulse, and

iv. means for processing the received pulse returns to produce Doppler frequency data,

wherein said means for processing comprises phase detecting means for providing in phase and quadrature phase analog data signals representing real and imaginary parts of the Doppler frequency data, and

b. a radar signal digital processing portion including:

i. means for converting said Doppler frequency data to a digital signal,

wherein said means for converting Doppler frequency data to a digital signal receives said in phase and quadrature phase analog signals and generates first and second digital words representing real and imaginary parts of the Doppler frequency data, and said means for dividing the converted digital signal into a plurality of digital Doppler frequency components is a discrete Fourier transform circuit,

ii. means for dividing the converted digital signal into a plurality of digital Doppler frequency components,

iii. a buffer memory connected to store the outputs of said dividing means at an interval equal to an integral multiple of the transmitting interval, and

iv. means for averaging the outputs of the buffer memory which represent the data of a plurality of every *n*-th (n is an integer) one of said unit azimuthal regions and for subtracting the average output from the data for the substantial center unit of said plurality of unit azimuthal regions, whereby the returns from said stationary and moving objects having a considerable azimuthal spread are substantially eliminated to bring out those returns from moving targets of limited azimuthal spreads.

4,053,886

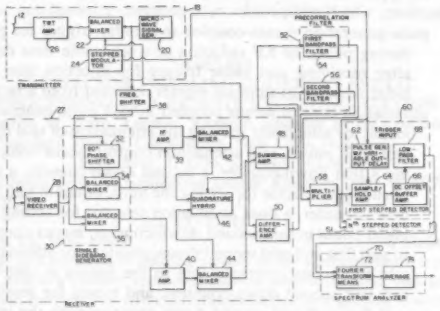
STEPPED DUAL-FREQUENCY, OCEAN-WAVE SPECTROMETER

John W. Wright, Accokeek, Md.; William J. Plant, Annandale, and Dale L. Schuler, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 19, 1976, Ser. No. 743,374

Int. Cl.[2] G01S *9/60*

U.S. Cl. 343—5 SA **13 Claims**



1. An ocean-wave, spectrometer radar system comprising:

transmitter means for generating a first local oscillator frequency and a sync signal, and for transmitting, in successive steps, coherently related pairs of frequencies having different, small, and known frequency separations;

coherent receiver means for receiving and separating the radar returns of said stepped pairs of frequencies;

frequency-shifter means connected between said transmitter means and said receiver means for shifting the frequency of said first local-oscillator frequency;

multiplier means receiving said separated radar returns for said stepped pairs of frequencies from said receiver and multiplying said separated radar returns to obtain a Bragg resonance condition for each step;

a plurality of stepped detector means, each receiving a sync signal from said transmitter and the output of said multiplier, each for detecting a different step of said multiplier output.

utilization means receiving the outputs of said stepped detector means, for processing and utilizing the outputs of said stepped detector means.

4,053,887

DOPPLER RADAR SYSTEM

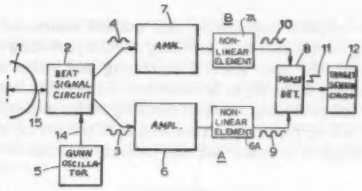
Kenneth Holford, Crawley, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,382

Claims priority, application United Kingdom, Nov. 29, 1974, 51762/74

Int. Cl.[2] G01S *9/44*

U.S. Cl. 343—9 **9 Claims**



1. A Doppler radar system comprising a phase detector responsive during each beat signal cycle to produce an output signal having a first level when the two beat signals have a relative phasing within specified limits and a second level when their relative phasing has shifted outside these limits, respective amplifying means to which said beat signals are applied before application to said phase detector, said amplifying means having a gain sufficient to produce, in the absence of said beat signals, output noise signals which are due to noise in the system and which render the phase detector responsive in accordance with the relative positions of their rising and falling edges to produce its output signal with either said first or second level, storage means responsive to the phase detector output signal for storing a representative level thereof, and threshold means responsive to provide an indication of a moving target when said representative level of output signal changes from a quiescent value to a threshold value.

4,053,888

ARRANGEMENT FOR MEASURING THE LAG BETWEEN TWO TIMED SIGNALS BY ELECTRONIC CORRELATION

Léon Robin, and Thaddeus Hawkes, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Oct. 5, 1976, Ser. No. 729,799

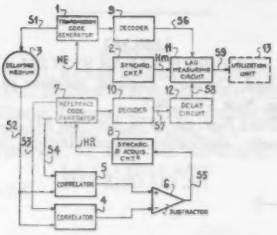
Claims priority, application France, Oct. 10, 1975, 75.31123

Int. Cl.[2] G01S *9/08*

U.S. Cl. 343—13 R **8 Claims**

1. An arrangement for measuring the lag between two timed signals by electronic correlation, comprising: a first circuit for generating a numerical coded signal, means for transmitting the said coded signal through a transmission medium, means for receiving the coded signal after said transmission, a discriminator circuit of the type comprising two correlation circuits for correlating the coded signal received with respective ones of two reference coded signals reproducing said numerical code and relatively displaced in time in such a way that their respective auto-correlation functions partially overlap to form a common range of lag measurement, and a differential circuit for providing a signal representing the difference be-

tween the correlation outputs, a first synchronising circuit for synchronising with a first clock signal the said first generator circuit, a second generator circuit for producing the said two reference signals, a second synchronising circuit for synchronising the said second generator circuit using a synchronising signal whose frequency is locked to the amplitude of the said difference signal, and lag measuring means comprising two state-decoding circuits having inputs connected to the said



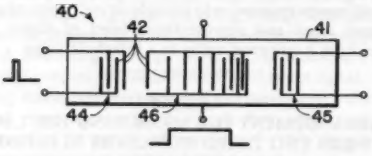
generator circuits respectively and outputs connected to a measuring circuit, said state decoding circuits providing each a pulse signal, the time interval separating said pulse signals corresponding to the lag to be measured, the said first synchronising circuit providing a second clock signal for measurement purposes whose period is a sub-multiple of the period of said first clock signal to enable the said measuring circuit to count pulses.

4,053,889

NON-LINEAR SPREAD SPECTRUM TRANSMITTER/RECEIVER FOR A HOMING SYSTEM

Robert H. Johnson, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed July 27, 1976, Ser. No. 709,052
Int. Cl.² G01S 9/233
U.S. Cl. 343—17.2 PC **2 Claims**



1. In a detection, track and homing system including a spread spectrum transmitter adapted to transmit signals to a remotely located target and a spread spectrum receiver adapted to receive signals reflected from the target in response to the transmitted signals impinging thereon where the velocities between the transmitter/receiver and the target are relatively high, surface acoustic wave apparatus providing doppler invariant pulse compression/expansion comprising:

a. a piezoelectric base;

b. a plurality of spaced apart interdigitated fingers formed on a surface of said base and interconnected to provide an input transducer and an acoustically coupled output transducer; and

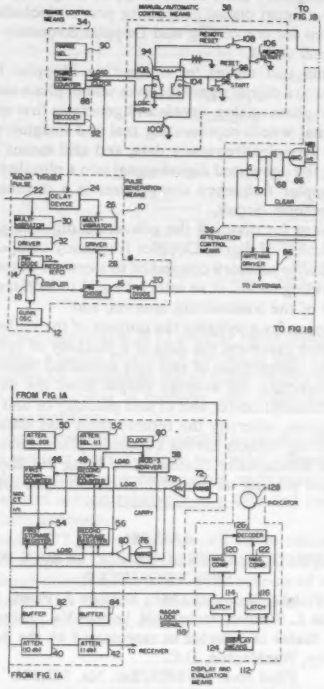
c. the fingers forming the output transducer having spacings therebetween which vary nonlinearly in a generally hyperbolic function for reducing frequency shift errors due to doppler effects.

4,053,890

INTERNAL CALIBRATION SYSTEM

David S. Woodson, III, Clinton, Md., and Louis R. Rudolph, Annandale, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 25, 1976, Ser. No. 689,895
Int. Cl.² G01S 7/40
U.S. Cl. 343—17.7 **4 Claims**



1. Apparatus for automatically calibrating a pulse-type radar receiver, which comprises:

pulse-generation means coupled to a radar trigger for producing pulses of RF radiation at a selectable time delay after receiving said radar trigger for injection into the radar receiver to simulate signals reflected from a target;

attenuation control means coupled to said pulse-generation means for selectively varying the attenuation of said time-delay RF pulses, said attenuation control means comprising a first down-counter, a second down-counter, a tens attenuation selector for setting the initial count in said first down-counter, a ones attenuation selector for setting the initial count in said second down-counter, means coupled to said first and said second down-counters for attenuating said RF pulses corresponding to the counts in said first and said second down-counters, and means for resetting said first and said second down-counters with the initial counts when the counts in said first and said second down-counters are zero;

range control means coupled to said pulse-generation means for selecting the time delay of said RF pulses, said range control means comprising a third down-counter coupled to said pulse-generation means to select to time delay of said RF pulses, said third down-counter being further coupled to said attenuation control means so that the third down-counter is clocked when the counts in said first and said second down counters are zero, and a range selector coupled to said third down-counter;

manual/automatic control means coupled to said range control means to control the counting of said third down-counter and to reset said third down-counter to the initial count when the count is zero, said manual/automatic control means further coupled to said attenuation control means to control the counting of said first and said second down-counters; and

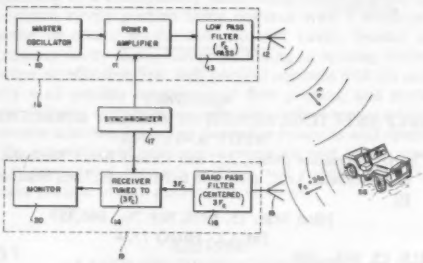
display and evaluation means coupled to said attenuation controll means and to a radar lock signal for determining the amplitude of said RF pulses which produces a radar tracking lock, said display and evaluation means further comparing the amplitude of said RF pulses which produces a radar lock with a predetermined standard to provide an indication of the radar receiver's operational status.

4,053,891

RADAR OBJECT DETECTOR USING NON-LINEARITIES

Charles L. Opitz, Westfield, NJ, assignor to Lockheed Electronics Company, Plainfield, N.J.

Filed May 24, 1967, Ser. No. 642,657
Int. Cl.² G01S 9/02
U.S. Cl. 343—5 SA **5 Claims**



1. A radar device for remotely detecting compound metal objects comprising, oscillator means for generating electromagnetic energy in at least one band of frequencies, antenna means for transmitting said energy in a beam toward said compound metal object, and receiver means tuned to a predetermined functionally related frequency band different from the first mentioned band of frequencies for detecting only that which is produced by the electrical non-linearity characteristics of the object.

4,053,892

SYSTEM FOR ENABLING COHERENT SIGNAL PROCESSING AT A REMOTE RECEIVING STATION

Charles W. Earp, London, England, assignor to International Standard Electric Corporation, New York, N.Y.

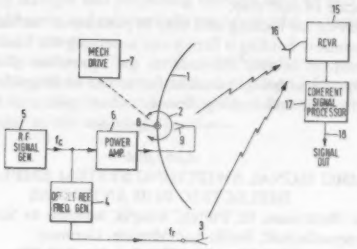
Filed Mar. 1, 1976, Ser. No. 662,342
Claims priority, application United Kingdom, Mar. 6, 1975, 9355/75
Int. Cl.² G01S 1/44
U.S. Cl. 343—106 R **8 Claims**

1. In a microwave landing system of the scanning beam type in which a remote receiving station derives angular navigational information from the transmissions of a ground beacon by processing signals received from said beacon, the combination of comprising:

a scanning antenna within said ground beacon, all the radiating elements of which are contemporaneously excited for sweeping a collimated beam through a predetermined angular sector of space;

first means for generating a first radio frequency signal to energize said scanning antenna;

second means responsive to said first radio frequency signal for generating a second ratio frequency signal therefrom, said second means being responsive to said first ratio frequency signal for generating said second ratio frequency with a predetermined phase relationship with said first radio frequency signal but offset therefrom in frequency, said second ratio frequency signal being substantially continuous during transmission of said first radio frequency signal, and substantially independent of the transmissions and angular position of said scanning antenna;



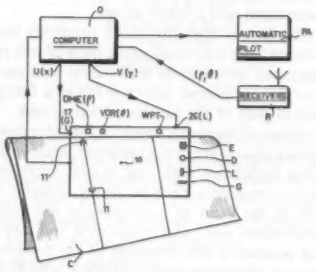
and a nonscanning second antenna arranged to provide radiation coverage at least over said sector swept by said scanning antenna, said second antenna being energized by said second radio frequency signal, said second radio frequency signal thereby providing a reference signal at said remote receiving station for coherent processing of said first radio frequency signal received at said remote station.

4,053,893

METHOD OF AND APPARATUS FOR INDICATING THE GEOGRAPHICAL POSITION OF A PILOT VEHICLE

Francis Boyer, Elancourt, France, assignor to Societe Francaise d'Equipements pour la Navigation Aerienne S.F.E.N.A., Velizy-Villacoublay, France

Filed Nov. 18, 1975, Ser. No. 632,971
Claims priority, application France, Nov. 18, 1974, 74.37993
Int. Cl.² G01S 3/02
U.S. Cl. 343—112 PT **4 Claims**



1. An apparatus for use in indicating the geographic position of a craft in accordance bearing and distance information from beacon transmitters, said indicating apparatus comprising

a casing;

a figurative point movable according to two orthogenal displacements;

an access slot gaping on three sides of said casing so as to receive a geographical map or portion of a map even when approximately oriented and folded for reception in said gap;

a window placed above said map receiving slot, said figurative point being displaceable in the area of said window in order to occupy any position in the window;

means for alignment with the meridian of said map, consti-

tuted by pointers which are brought into coincidence with said meridian;

two associated transducers for supplying signals representing angular position information of said map with respect to said indicating apparatus, this information being a function of the respective positions of said pointers;

means for setting values for basic reference information signals including information on magnetic declination, and scale of said map;

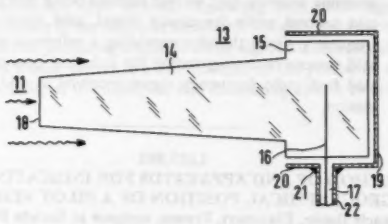
a device for locking said map in position at the back of said window holding it firmly and accepting the folding of said map in several thicknesses, the operation of indicating apparatus being subordinated to the locking of said maps through said locking device.

4,053,894

RADIO SIGNAL SWITCHING SYSTEM EMPLOYING DIELECTRIC ROD ANTENNAS

Oskar Beckmann, St. Polten, Austria, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Mar. 20, 1975, Ser. No. 560,404
Claims priority, application Germany, Mar. 21, 1974, 2413744
Int. Cl.² H01Q *13/20*
U.S. Cl. 343—225 **8 Claims**



1. A transmission arrangement for the transmission of a control signal to each control path of a number of controllable semiconductor valves in a static high-voltage converter and for firing said valves, comprising:

a. a high-frequency transmitter for emitting high-frequency electromagnetic radiation which is modulated in dependence upon said control signal;

b. a plurality of high-frequency receivers located at some distance from said transmitter, each of said receivers being associated with one of said valves and each including a demodulator whose output is fed as a firing signal to the control path of the associated valve; and

c. a number of receiving antennas for receiving said high-frequency electromagnetic radiation, each receiving antenna being associated with one of said plurality of high-frequency receivers, each receiving antenna having a front part in the form of a cylindrical rod tapered along its longitudinal axis, said cylindrical rod having its smaller end pointed in the direction of the transmitted high-frequency electromagnetic radiation which it is to receive and said cylindrical rod consisting of material which is electrically non-conductive, and each receiving antenna having a rear part including coupling means for coupling the high-frequency electromagnetic radiation traveling along said cylindrical rod to the associated high-frequency receiver, a metal plate being disposed at the larger end of said rod, such that the normal to said plate is aligned with the radiation direction of said transmitter, said plate having a slot whose height is equal to half a wavelength of said radiation when said radiation is in said rod and whose width is substantially smaller than said half a wavelength, whereby the receiving antenna will not promote electrical discharges which would otherwise result because of the large potential difference between individual semiconductor valves and between a semiconductor valve and ground.

4,053,895

ELECTRONICALLY SCANNED MICROSTRIP ANTENNA ARRAY

Carmen S. Malagisi, Rome, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 24, 1976, Ser. No. 744,498
Int. Cl.² H01Q *3/26*
U.S. Cl. 343—700 MS **10 Claims**

1. An antenna element comprising:

a metallic disc in juxtaposition with a metallic ground plane member and separated therefrom by a dielectric medium,

an electrical short circuit connecting the center of said metallic disc and said ground plane member,

at least two pairs of diametrically opposed short circuiting switches connected between the edge of said disc and said ground plane member, and

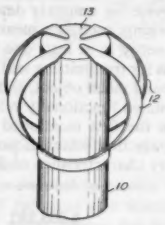
a phase control circuit for actuating said short circuiting switches.

4,053,896

SELF-ERECTING, HEMISPHERICALLY DIRECTIONAL BUOY ANTENNA

Charles Raymond Bitter, Jr., and Robert Bruce Malcolm, both of Scottsdale, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 15, 1976, Ser. No. 666,853
Int. Cl.² H01Q *1/34*
U.S. Cl. 343—709 **7 Claims**



1. A self-erecting, hemispherically directional antenna comprising:

a. a body;

b. movable means affixed to said body and movable with relation thereto from a first to a second position;

c. a plurality of elongated, electrically conductive spring members each connected at one end to said body and at the other end to said movable means, said spring members being generally equally spaced about a central axis;

d. said spring members assuming a stored position with said movable means in the first position and defining spaced apart arcuate portions of a sphere with said movable means in the second position;

e. connecting means electrically coupled to said spring members for coupling radio signals between said spring members and a radio;

f. said movable means being biased toward the second position; and

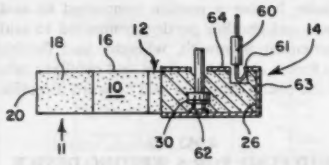
g. releasable means normally positioned to hold said movable means in the first position and releasable to allow said movable means to move to the second position.

4,053,897

MICROWAVE ELEMENT INCLUDING SOURCE ANTENNA AND CAVITY PORTIONS

Eldon Nerheim, Edina, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 14, 1976, Ser. No. 732,263
Int. Cl.[2] H01Q *13/00*; H03F *1/36*
U.S. Cl. 343—785 15 Claims



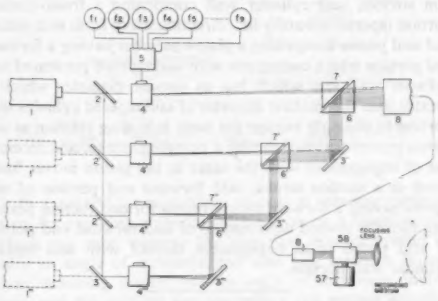
1. A microwave element, including: dielectric means including an antenna portion, an iris formed as a reduced cross section in said dielectric means, and a microwave cavity portion; said antenna portion of said dielectric means having a reduced cross section opposite said iris with said reduced cross section terminating in a continuously diminishing configuration; said microwave cavity portion being covered with a conductive material to create microwave resonant cavity means; said microwave cavity means further including an opening midway between an effective first wall portion adjacent said iris and a cavity wall portion opposite said first portion; and surface means defining said opening with said surface means adapted to receive microwave energy generator means in said opening for the generation of microwave energy in said cavity means that is propagated through said iris and radiated from said antenna portion of said microwave element.

4,053,898

LASER RECORDING PROCESS

Kazuhiro Hirayama, Yokohama; Yasushi Sato, Kawasaki; Taisuke Tokiwa, Yokohama; Kazuo Kawakubo, Hino; Fujio Iwatate, Tokyo, and Hisashi Nakatsui, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 607,503, Aug. 25, 1975, Ser. No. 607,504, Aug. 25, 1975, and Ser. No. 594,126, July 8, 1975. This application Sept. 3, 1975, Ser. No. 610,082
Claims priority, application Japan, Sept. 13, 1974, 49-105632
Int. Cl.[2] G06K *15/12*
U.S. Cl. 346—1 17 Claims



1. An optical recording method for recording image information upon a recording medium, comprising the steps of:

forming at least two light beams;

projecting said light beams along first and second paths, respectively;

dividing and simultaneously modulating each of said light beams to form respective first and second groups of modulated beams, wherein the beams of each said group are spaced along respective first and second imaginary straight lines, each of which projects through the beams of its associated group and is disposed substantially perpendicular to the directions of travel of the beams;

directing each said group of beams through optical means for disposing such groups in a common array wherein the linearly spaced beams of each group are linearly spaced from the beams of the other group along a third substantially straight line projecting through each of said modulated beams and substantially perpendicular to their directions of travel; and

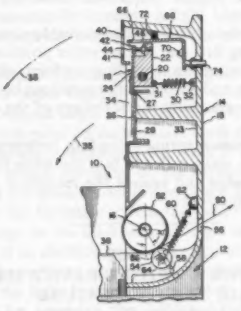
scanning said recording medium with said array of modulated beams to form straight lines of image information on said recording medium in a direction substantially perpendicular to the scanning direction.

4,053,899

ELECTROGRAPHIC RECORDER COVER ASSEMBLY WITH RETRACTABLE ELECTRODES

Robert F. Strange, Round Rock, Tex., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Apr. 2, 1976, Ser. No. 673,034
Int. Cl.[2] G01D *9/00*, *15/00*
U.S. Cl. 346—68 12 Claims



1. An electrographic segment electrode mounting assembly supportable in a cover for a base of an electrographic printer to dispose electrographic electrodes in a first protected and inoperative position when the printer cover is open and in a second operative position when the printer cover is closed with respect to the base of the printer, comprising:

a segment electrode assembly;

support means pivotable about a fixed axis for mounting the segment electrode assembly to an electrographic printer cover movable between an open position and a closed position;

frame means for encompassing the segment electrode assembly in a first protected and inoperative position when the cover is open;

biasing means cooperatively mounted between the segment electrode assembly and the electrographic printer cover to maintain the segment electrode assembly in the first protected and inoperative position when the cover is open; and

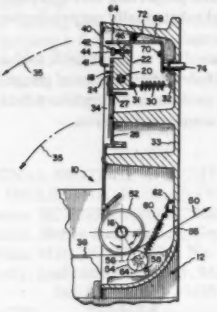
actuating means for moving the segment electrode assembly from the first protected and inoperative position to the second operative position when the cover is closed.

4,053,900

ELECTROGRAPHIC PRINTER RECORDING MEDIUM LOADING ASSEMBLY

Robert F. Strange, Round Rock, Tex., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Apr. 2, 1976, Ser. No. 673,033
Int. Cl.[2] G01D *15/34*
U.S. Cl. 346—136 10 Claims



1. An electrographic printer recording medium loading assembly, comprising:

an electrographic printer cover structurally defining a ramp member;

a drive roller mounted to the printer cover;

a length of recording medium disposable to tangentially approach and engage the drive roller and be driven thereby;

a wrap roller bearing against and movable along the ramp member having first and second roller positions for cooperatively engaging the recording medium with the drive roller, the first and second roller positions being disposed in an arcuate path about the periphery of the drive roller; and

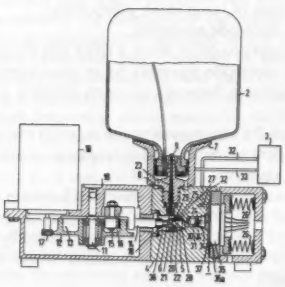
at least one extension spring extending between the printer cover and the wrap roller to bias the wrap roller against the ramp member and against the recording medium engaging the drive roller.

4,053,901

FLUID PUMP FOR A WRITING DEVICE HAVING AN AIR EJECTOR FEATURE

Bengt Skafvenstedt, Stockholm; Sture Ahlgren, Vaellingby, and Eberhard Tschuertz, Jaerfaella, all of Sweden, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 29, 1976, Ser. No. 745,573
Claims priority, application Germany, Dec. 22, 1975, 2557961
Int. Cl.[2] G01D *15/16;* B43K *5/04, 5/18;* F04B *21/00*
U.S. Cl. 346—140 R 3 Claims



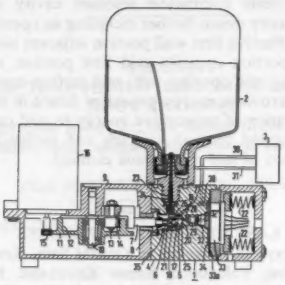
1. A pump mechanism for delivering ink or the like writing fluid from a fluid reservoir to a writing device comprising pump housing means, means forming a cylinder in said housing comprising a suction chamber and a pumping chamber, a piston carried within said cylinder and movable in a forward direction to block communication between said suction and pumping chambers, and in a backward direction to open communication between said suction and pumping chambers, means including a capillary tube for communicating said suction chamber and the reservoir, and flexible membrane means in said cylinder having a portion connected to said pump housing means and another portion connected to said piston for joint movement therewith, whereby said flexible membrane means forces air bubbles from said capillary tube to the reservoir as the piston moves in said forward direction.

4,053,902

FLUID PUMP FOR A WRITING DEVICE

Bengt Skafvenstedt, Stockholm; Sture Ahlgren, Vaellingby, and Eberhard Tschuertz, Jaerfaella, all of Sweden, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 29, 1976, Ser. No. 745,574
Claims priority, application Germany, Dec. 22, 1975, 2558063
Int. Cl.[2] G01D *15/16;* B43K *5/04, 5/18;* F04B *7/04*
U.S. Cl. 346—140 R 7 Claims



1. A pump mechanism for delivering ink or the like writing fluid from a reservoir to a writing device comprising a pump housing having an internal cylinder wall forming a cylinder, a piston disposed within said cylinder and slidable forward in a pumping stroke and backward in a suction stroke, and drive means for moving said piston through said pumping and suction strokes, said cylinder wall comprising a frusto-conical portion tapered inwardly in a direction away from said piston, and said piston comprising a plastic member having a forward end portion which cooperates with said tapered portion of said cylinder wall and which has an outside diameter which is greater than the smallest diameter of said tapered cylinder wall portion to slidingly engage the same in sealing relation as said piston moves forward during a pumping stroke, and to move out of engagement with the same as the piston moves backward in a suction stroke, said forward end portion of said piston having a forward facing recess formed therein permitting radially inward deformation of said forward end portion of said piston upon engagement thereof with said tapered cylinder wall portion.

4,053,903

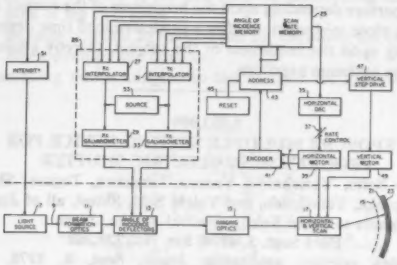
SCANNING RATE AND INTENSITY CONTROL FOR OPTICAL SCANNING APPARATUS

Thomas W. Schultz, Seneca Falls, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 23, 1976, Ser. No. 699,047
Int. Cl.[2] G03B *41/00*
U.S. Cl. 354—1 6 Claims

1. In a control system for use with an optical scanning expo-

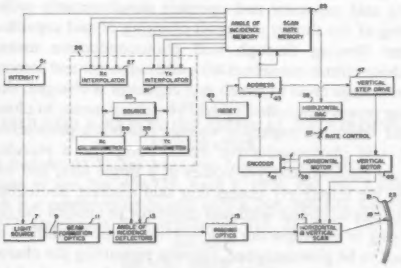
sure system in manufacturing cathode ray tubes having a faceplate with a layer of photosensitive material thereon, said optical scanning exposure system including a light source with a wavelength spectrum for exposing the photosensitive material, means for scanning the faceplate with a light beam, and means for deflecting the light beam at an angle related to the angle of incidence of an electron beam in a cathode ray tube, and said electrical control system including an angle of incidence and scan rate memory means, a scan rate means for controlling scanning of the light beam, and an angle of incidence deflection control means for controlling the angle of incidence of the light beam, the improvement comprising means for controlling the integral with respect to time of the light beam intensity at each exposed region of photosensitive material on the faceplate of the cathode ray tube to provide a predetermined amount of exposure at predetermined positional locations across the surface of the faceplate.



4,053,904
OVERLAP AND OVERSCAN EXPOSURE CONTROL SYSTEM

G. Norman Williams, Seneca Falls, and Mahlon B. Fisher, Skaneateles, both of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 23, 1976, Ser. No. 699,054
Int. Cl.² G03B *41/00*
U.S. Cl. 354—1 **6 Claims**



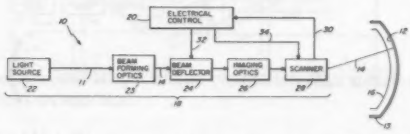
1. In a method for controlling an optical scanning exposure system for exposing a photosensitive layer on a faceplate of a cathode ray tube wherein the electrical control system includes an angle of incidence and scan rate memory storage means, scanning means, and an angle of incidence control means and the method for controlling the optical scanning exposure system includes the steps of activating the scan rate means to cause light beam scanning of the faceplate of the cathode ray tube, applying signals representative of the positional location of a light beam to the angle of incidence and scan rate memory means to derive signals representative of the angle of incidence of an electron beam, coupling the signals representative of the angle of incidence of an electron beam to said angle of incidence control means, and coupling signals representative of said desired rate of scan to said means for effecting horizontal and vertical scanning, the improvement comprising the added step of:

retrieving from said angle of incidence and scan rate memory means signals for altering the operation of said scan rate means to cause said horizontal and vertical light beam scanning means to provide overlapping adjacent horizontal scan lines and more uniform illumination of the photosensitive layer on the faceplate of the cathode ray tube.

4,053,905
OPTICAL SCANNING APPARATUS FOR PHOTOLITHOGRAPHY OF A COLOR CATHODE RAY TUBE HAVING AN APERTURE MASK

John Schlafer, Wayland, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed June 23, 1976, Ser. No. 699,109
Int. Cl.² G03B *41/00*
U.S. Cl. 354—1 **41 Claims**



1. An optical scanning apparatus for use in manufacturing cathode ray tubes wherein a layer of a photosensitive material on the inner surface of a tube faceplate is exposed by scanning a light beam over an array of light-transmitting apertures in a mask disposed adjacent to the layer of material on the faceplate, the apparatus including:

a. a light source for creating a light beam having a wavelength spectrum which exposes the photosensitive material,

b. means disposed in the path of the light beam for deflecting the light beam through an angle which is related to a predetermined angle of incidence that an electron beam has at each point on the aperture mask as it passes through the transparent regions of the mask in an operating tube,

c. optical means, operating on the deflected light beam, for imaging the point of deflection of the light beam substantially at the faceplate so that the light beam may be made to impinge on the mask with an angle of incidence related to that of an electron beam in an operating tube, the angle of incidence being obtained substantially without translation of the light beam at the faceplate, and

d. means for scanning the deflected light beam over the aperture mask in a predetermined fashion to expose the photosensitive material adjacent to all light-transmitting regions on the mask, the deflecting means being operative in synchronism with the scanning means to provide the light beam with the proper angle of incidence for each light-transmitting region on the mask.

4,053,906
CONTROL SYSTEM FOR AN OPTICAL SCANNING EXPOSURE SYSTEM FOR MANUFACTURING CATHODE RAY TUBES

Thomas W. Schultz, Seneca Falls, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

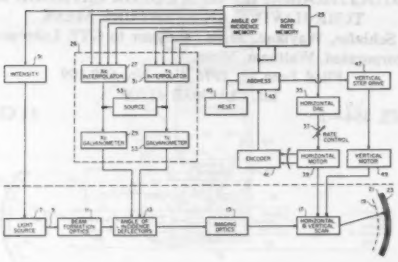
Filed June 23, 1976, Ser. No. 699,045
Int. Cl.² G03B *41/00*
U.S. Cl. 354—1 **16 Claims**

1. In an optical scanning exposure system for use in manufacturing cathode ray tubes having a faceplate with a layer of photosensitive material thereon and the scanning exposure system including a light source providing a light beam having a wavelength spectrum for exposing photosensitive material, means for deflecting the light beam at an angle related to an angle of incidence of an electron beam at a plurality of points on the faceplate of an operating cathode ray tube, and means

for effecting horizontal and vertical light beam scanning of the faceplate of the cathode ray tube, a control system comprising:

storage means for storing information representative of the proper angle of incidence of a light beam at a matrix of positional locations on the faceplate of said cathode ray tube and of the rate of scan of the light beam from one positional location to the next;

encoder means coupling said means for effecting horizontal and vertical light beam scanning to said storage means and providing horizontal and vertical light beam scan position information to said storage means;



scan rate means coupling said storage means to said horizontal and vertical light beam scanning means and providing electrical signals for controlling the rate of light beam scanning intermediate to said positional locations of said matrix; and

angle of incidence control means coupling said storage means to said angle of incidence deflection means and providing electrical signals related to the angle of incidence of an electron beam to control the angle of incidence of said light beam.

4,053,907

PROGRAM-CONTROLLED SHUTTER

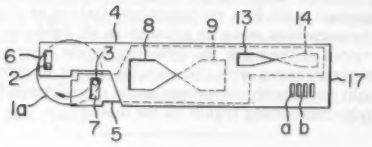
Hiroshi Iwata, Osaka, and Katsuji Ishikawa, Higashi, both of Japan, assignors to West Electric Co., Ltd., Japan

Filed Oct. 14, 1975, Ser. No. 621,819

Claims priority, application Japan, Oct. 18, 1974, 49-120903; Oct. 18, 1974, 49-120904

Int. Cl.[2] G03B 7/14

U.S. Cl. 354—29 **9 Claims**



1. A program-controlled shutter comprising

a. aperture setting means including a plurality of shutter blades adapted to be used as the aperture setting blades, a step-motor drivingly coupled to said plurality of shutter blades for displacing them stepwise, and a driving circuit adapted to control the rotation of said step-motor in response to the input driving pulse or pulses;

b. shutter-blade-displacement detecting means for providing a series of output pulses each corresponding to an incremental motion of said shutter blades during the displacement of said shutter blades;

c. driving pulse generating means adapted to generate said driving pulse or pulses to be applied to said step-motor in response to the output pulses from said shutter-blade-displacement detecting means; and

d. photometric means for detecting the brightness of a subject and for generating a brightness detection signal corresponding to the amount of said brightness from said subject that passes through said shutter blades during the time when said shutter blades are so displaced to define an aperture and to generate a shutter closing signal to be applied to said driving circuit and said driving pulse generating means when the integrated value of the brightness detection signal reaches a predetermined level, whereby said shutter blades are displaced to define the optimum aperture depending upon the brightness of the subject and to close said aperture after a predetermined time depending upon the brightness of the subject, thereby attaining the optimum exposure.

4,053,908

EXPOSURE MULTIPLE SETTING DEVICE FOR PROGRAMMING ELECTRIC SHUTTER

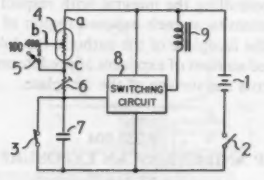
Takeo Saito, Yotsukaido; Yuzuru Takazawa, Togane; Shinji Nagaoka, Yotsukaido, and Yoichi Seki, Shisui, all of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Filed Sept. 3, 1976, Ser. No. 720,368

Claims priority, application Japan, Sept. 4, 1975, 50-122021[U]

Int. Cl.[2] G03B 7/08

U.S. Cl. 354—31 **5 Claims**



1. A control circuit for a programming electric shutter of a camera comprising: a d.c. power supply, photoconductive means for sensing the brightness of a subject to be photographed, a timing capacitor connected in series with said photoconductive means between positive and negative terminals of said power supply, trigger switch means normally short-circuiting said capacitor and operable simultaneously with the opening of the shutter to permit charging of said capacitor by current flowing through said photoconductive means, a switching circuit connected with said capacitor and responsive to the voltage level to which said capacitor is charged, shutter closing means controlled by said switching means to close the shutter when the capacitor voltage reaches a predetermined level, said photoconductive means comprises a plurality of discrete photoconductive bodies in a single unit, and switch means for selectively connecting said discrete photoconductive bodies in circuit with said capacitor to control the rate of charging of said capacitor as a function of the brightness of the subject to be photographed, thereby permitting the characteristics of said photoconductive means to be matched to the speed of the film used in the camera.

4,053,909

DATA REGISTERING EQUIPMENT FOR A CAMERA

Nobuhiko Shinoda, Tokyo; Tadashi Ito; Fumio Ito, both of Yokohama, and Soichi Nakamoto, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 6, 1975, Ser. No. 547,462

Claims priority, application Japan, Feb. 12, 1974, 49-16985

Int. Cl.[2] G03B 17/24

U.S. Cl. 354—105 **5 Claims**

1. For a camera defining a film position and forming exposure information signals, a data recording apparatus comprising:

data setting means for having data set therein and generating pulses corresponding to a set value,

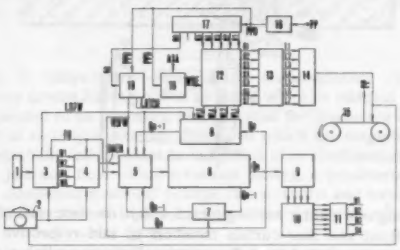
receiving means for receiving exposure information signals in the form of pulses,

a first gate coupled to said data setting means and receiving means for passing one of the output signals of said data setting means and exposure information signal of the receiving means,

a counter coupled to the first gate for memorizing the outputs of the first gate,

a decoder coupled to the counter for decoding the content memorized by the counter,

recording means coupled to the decoder for applying the



memorized content decoded by the decoder to the film position as visible indications,

first pulse generating means to generate pulse signals in response to shifting of the position of the film,

second pulse generating means coupled to said first pulse generating means for generating timing pulses based on the pulse signals from said first pulse generating means and for setting the timing of the application by the recording means on the basis of the timing pulses thereof, and

a second gate connected between said decoder and recording means and coupled to said second pulse generator means for applying the output of said decoder on the recording means in synchonism with the timing pulses of said second pulse generating means.

4,053,910

MULTIPLE EXPOSURE OPTICAL RECORDING APPARATUS

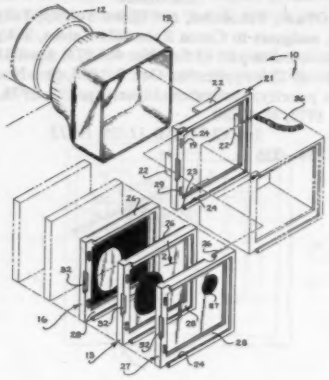
Jurij Bodnar, 41 E. 3rd Ave., San Mateo, Calif. 94401

Division of Ser. No. 458,725, April 8, 1974, Pat. No. 3,940,775, which is a continuation-in-part of Ser. No. 344,107, March 23, 1973, abandoned. This application Feb. 23, 1976, Ser. No. 660,612

Int. Cl.² G03B *15/00*

U.S. Cl. 354—120 **7 Claims**

1. Apparatus for composing pictures of objects comprising a camera having means for transporting film with frames each of given size therethrough, a lens serving to direct light onto said film, first and second mask assemblies serving to block light to complementary portions of a frame of said film, said first and second mask assemblies each having a size corresponding to said given size of said frames of said film, and means serving to dispose each of said first and second mask assemblies for use in succession in front of said lens comprising a tubular sun shade mounted on said camera with one end surrounding said lens and having an axial length substantially equal to that distance serving to maintain substantially a one-to-one ratio between said size of said mask assemblies and said given size of said frames of said film to inhibit exposure of complementary portions of a frame to said film and to facilitate the provision of substantially indistinguishable demarcation between the areas



of the recorded images of said objects recorded at different positions on said film.

4,053,911

LIGHT-RECEIVING DEVICE FOR USE WITH THE EXPOSURE METER IN SINGLE LENS REFLEX CAMERA

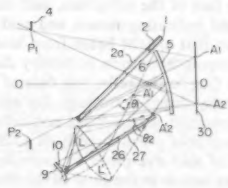
Jun Shimomura, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Dec. 19, 1975, Ser. No. 642,335

Claims priority, application Japan, Dec. 27, 1974, 49-148855

Int. Cl.² G03B *19/12*

U.S. Cl. 354—152 **7 Claims**



1. In a single lens reflex camera having a finder optical system, an objective lens, and a meter device including a light receiving portion:

a. a principal mirror for reflecting part of the light passing through said objective lens toward said finder optical system and for transmitting therethrough the remainder of said light;

b. first optical means including a reflector member and disposed between said principal mirror and the focal plane of the objective lens and in inclined relationship with respect to the optical axis of said objective lens;

c. a condensing mirror extending between the image of an object formed by and between said objective lens and said first optical means and the light-receiving portion of said metering device; and

d. an image-forming half-lens provided on said condensing mirror to condense said image of the object toward said light-receiving portion of said metering device by cooperating with said condensing mirror, the optical axis of said half-lens being substantially coincident with the reflecting surface of said condensing mirror.

4,053,912
VIEW FINDER SYSTEM FOR A SINGLE LENS REFLEX CAMERA

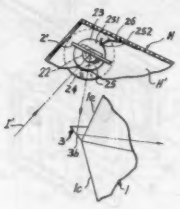
Youichi Okuno, Yokohama, and Hideo Yokota, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 460,075, April 11, 1974, abandoned. This application Oct. 2, 1975, Ser. No. 618,920

Claims priority, application Japan, Apr. 17, 1973, 48-45279; Apr. 17, 1973, 48-45280

Int. Cl.[2] G03B *13/06, 19/12*

U.S. Cl. 354—225 **10 Claims**



1. A view finder system for a single lens reflex camera associated with a lens barrel having an objective lens and photographic information indicating means mounted thereon, comprising:

a focusing screen on which an image of an object to be photographed is formed by said objective lens;

an eye-piece

a pentagonal roof prism having a bottom face optically facing said focusing screen, two roof faces, a front reflecting face, an exit face optically facing said eye-piece and a front non-reflecting face, and directing light from said focusing screen to said eye-piece to provide the image of the object in a field of the finder;

a sub-prism having a single entrance face, a single reflecting face and a single exit face cemented to a lower portion of the front non-reflecting face of said pentagonal roof prism, wherein said entrance face faces upward; and

a mirror optically facing both the indicating means and the entrance face of the sub-prism, said mirror being located above said indicating means and said sub-prism and arranged so that a light beam from said indicating means incident upon the mirror is thereby directed through the entrance face to the reflecting face of said sub-prism and also thereby directed through the exit face of said sub-prism cemented to the front non-reflecting face of said pentagonal roof prism directly in a direction of an upper portion of said eye-piece to provide an image of said indicating means in the field of the finder.

4,053,913
ELECTRIC SHUTTER DEVICE FOR A FOCAL PLANE SHUTTER

Akihiko Sato, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Apr. 6, 1976, Ser. No. 674,280

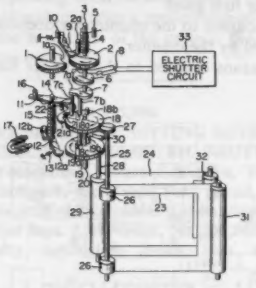
Claims priority, application Japan, Apr. 19, 1975, 50-52661[U]

Int. Cl.[2] G03B *9/34*

U.S. Cl. 354—244 **12 Claims**

1. In a focal plane shutter device having: film winding means; shutter moving means including a front curtain interlocking part interlocked with a shutter front curtain energized for movement in the operational direction for shutter release and a rear curtain interlocking part interlocked with a shutter rear curtain energized for movement in the same direction as that of said front curtain; a front curtain member being disposed in a displaceable manner at a first position engageably to stop said front curtain interlocking part and at a second position to enable the shutter front curtain to travel by release of said front curtain interlocking part; a rear curtain member displaceably provided at a first position engageably to stop said rear curtain interlocking part, and at a second position to enable the shutter rear curtain to travel by releasing said rear curtain interlocking part; and rear curtain control means engageably to stop said rear curtain member at said first position until lapse of a predetermined exposure time commencing at shutter release operation, the improvement which comprises:

a. control means interlocked with the film winding operation to charge the shutter at the time of film winding by actuating said shutter moving means, and to displace each of said front and rear curtain members to said respective first positions, and including means for accumulating positional energy, said control means being operable to displace said front curtain member to the second position at the time of shutter release by discharging the positional energy accumulated during film winding; and



b. shutter release means disposed engageably to retain said control means in a shutter charging condition.

4,053,914
LIGHT EMISSIVE DIODE

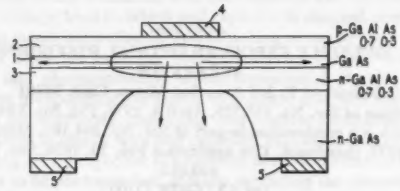
Anthony Richard Goodwin, Great Dunmow, England, assignor to ITT Industries, Inc., New York, N.Y.

Filed Sept. 9, 1975, Ser. No. 611,727

Claims priority, application United Kingdom, Oct. 3, 1974, 42947/74

Int. Cl.[2] H01L *33/00*

U.S. Cl. 357—17 **6 Claims**



1. A uni-directional light emissive diode having improved linear response characteristics comprising:

an active junction region for propagating light in a plane substantially parallel to said junction and in a plane substantially perpendicular to said junction;

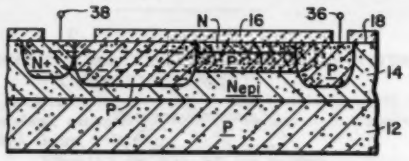
a mesa for containing said active region having a pair of top and bottom opposing surfaces and tapered sides connecting between said surfaces said tapered sides inclining toward said top surface for reflecting said parallel light in a direction perpendicular to said bottom surface and mixing said parallel light with said perpendicular light and causing said light to become uni-directional; and

a cavity approximate said second surface for receiving one end of an optical fiber therein. whereby said uni-directional light is transmitted into said optical fiber.

4,053,915
TEMPERATURE COMPENSATED CONSTANT CURRENT SOURCE DEVICE

David L. Cave, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 22, 1976, Ser. No. 669,065
Int. Cl.² H01L *29/80, 29/78, 27/02*
U.S. Cl. 357—22 2 Claims



1. A temperature compensated semiconductor current source device having a first terminal which is adapted to be connected to an operating bias potential for producing a current at an output terminal thereof of which the magnitude is substantially independent to variations of in combination:

a junction field effect transistor having a predetermined, controlled pinch-off voltage characteristic and having;

a. an epitaxial layer of semiconductor material of a first conductivity type;

b. a drain electrode comprising a semiconductor material of a second conductivity type, said drain electrode being diffused into said epitaxial layer;

c. a source electrode comprising said semiconductor material of said second conductivity type having a predetermined value of resistivity being diffused into said epitaxial layer;

d. a source to drain channel region of said second conductivity type being formed into said epitaxial layer between said source and drain electrodes, said channel region being ion-implanted;

e. a first region of a semiconductor material having a higher concentricity of said first type, said first region being diffused into said epitaxial layer adjacent to said source electrode; and

f. a second region of said first conductivity type formed into said epitaxial layer which extends into said first region and having a bottom surface contiguous along the upper surface of said source to drain ion-implanted channel;

g. first metal conductor means for connecting said first region to the first terminal of the device;

h. second metal conductor means for connecting said drain electrode to the output terminal;

said source electrode being extended in its physical area such that a linear diffused resistor is formed integrally therewith having a predetermined temperature coefficient that is a function of the resistivity of said semiconductor material comprising said source electrode; and

said diffused resistor and said field effect transistor having respective temperature coefficients which compensate each other so that the magnitude of the current produced at the output terminal of the current source device is substantially independent to temperature variations.

4,053,916
SILICON ON SAPPHIRE MOS TRANSISTOR

James R. Cricchi, Catonsville, and Michael D. Fitzpatrick, Glen Burnie, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 4, 1975, Ser. No. 610,493
Int. Cl.² H01L *27/12, 29/78, 29/34*
U.S. Cl. 357—23 10 Claims

1. A planar transistor comprising

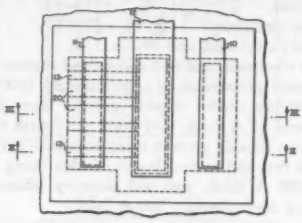
a. a semiconductive structure including:

1. a channel region of a first conductivity type interposed between drain and source regions of a second conductivity type,

2. at least one high conductivity region of said first conductivity type contiguous to said source and channel regions;

b. an insulating layer overlying said channel region;

c. an electrically conductive layer overlying said insulating layer to form the gate of said transistor;



d. electrically conductive means electrically coupled to said drain region to form the drain terminal of said transistor; and

e. electrically conductive means coupled to said source region and to said high conductivity region to form the source terminal of said transistor

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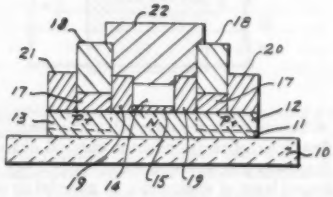
4,053,917
DRAIN SOURCE PROTECTED MNOS TRANSISTOR AND METHOD OF MANUFACTURE

Franklyn C. Blaha, Glen Burnie; James R. Cricchi, Catonsville, and Marvin H. White, Laurel, all of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 16, 1976, Ser. No. 714,412
Int. Cl.² H01L *29/78, 29/34, 49/02*
U.S. Cl. 357—23 1 Claim



1. A drain source protected MNOS transistor comprising

a substrate of electrically insulating material,

a mesa of N type semiconductor material deposited on the surface thereof,

a source region formed by P+ diffusions into a portion of said mesa adjacent one edge thereof,

a drain region formed by P+ diffusions into a portion of said mesa adjacent the edge thereof opposite said source region,

a first region of gate silicon dioxide growth on said mesa surface covering a strip of the channel portion thereof opposite said source region,

a second region of gate silicon dioxide growth on said mesa surface covering a strip of the channel portion thereof adjacent said drain region,

a substrate gate window on said mesa surface in part defined by said first and second gate silicon dioxide growth regions,

a tunneling silicon dioxide growth layer on and coextensive with said substrate gate window,

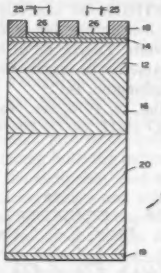
a layer of memory silicon nitride on and coextensive with said tunneling silicon dioxide growth layer,
a third region of gate silicon dioxide growth on said source region adjacent said first region of gate silicon dioxide,
a fourth region of gate silicon dioxide on said drain region adjacent said second region of gate silicon dioxide,
a first layer of silox on said third region of gate sillicon dioxide,
a second layer of silox on said fourth region of gate silicon dioxide,
a drain electrode,
a source electrode, and
a gate electrode, said first and second regions of gate silicon dioxide growth being approximately 1000 A thick, said tunneling silicon dioxide growth layer being approximately 25 A thick, said third and fourth regions of gate silicon dioxide growth being approximately 300 A thick, said first and second layers of silox being approximately 10,000 A thick, and said memory silicon nitride layer being approximately 300 A thick.

4,053,918

HIGH VOLTAGE, HIGH CURRENT SCHOTTKY BARRIER SOLAR CELL

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Richard J. Stirn, La Canada, Calif.

Filed Aug. 5, 1974, Ser. No. 495,021
Int. Cl.² H01L *27/14, 31/00, 29/48, 29/205*
U.S. Cl. 357—30 **8 Claims**



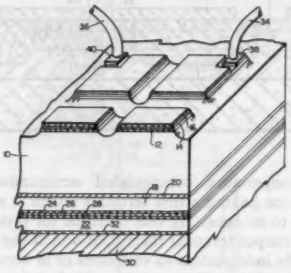
1. A Schottky barrier solar cell comprising:
a first layer of semiconductor material characterized by a first band gap width on the order of 1.4eV;
a second layer of semiconductor material on top of said first layer and characterized by a second band gap width which is wider than the band gap of said first layer and is on the order of 2eV, the thickness of said second layer being on the order of not more than one micron;
a third layer of semitransparent metal on top of said second layer and forming therewith a Schottky barrier, the thickness of said third layer being on the order of tens of angstroms, said third layer having a top surface remote from said second layer;
a first electrical contact in electrical contact with said third layer at the top surface thereof, the top surface of said third layer, other than the surface portion covered by said first electrical contact, being exposable to solar radiation whereby at least some photons of energies greater than said second band gap are absorbed in said second layer, and photons of energies greater than said first band gap and less than said second band gap pass through said second layer and are absorbed in said first layer, with photons absorbed in both layers generating carriers which move to said barrier; and
means including a second electrical contact, in contact with said first layer of semiconductor material.

4,053,919

HIGH SPEED INFRARED DETECTOR

Austin M. Andrews, II; John E. Clarke; Joseph T. Longo, and Edward R. Gertner, all of Thousand Oaks, Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 18, 1976, Ser. No. 715,760
Int. Cl.² H01L *27/14*
U.S. Cl. 357—30 **1 Claim**



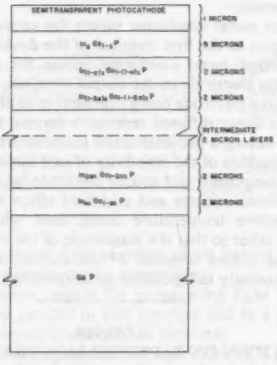
1. A high speed photodiode device particularly adapted to operate as a detector in the 10.6 μ portion of the infrared spectrum comprising (A) a substrate composed of a vapor transport grown $Pb_{0.8}Sn_{0.2}Te$ p-type material; (B) a first layer epitaxially grown on said substrate for absorbing 10.6 μm radiation and being composed of a $Pb_{0.8}Sn_{0.2}Te$ p-type material; and (C) a second layer epitaxially grown on said first layer to provide a region transparent to 10.6μm radiation and being composed of a $Pb_{0.9}Sn_{0.1}Te$ n-type material.

4,053,920

STEP GRADED PHOTOCATHODE

Ronald E. Enstrom, Skillman, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation of Ser. No. 630,234, Nov. 10, 1975, abandoned. This application Dec. 21, 1976, Ser. No. 753,158
Int. Cl.² H01L *27/14*
U.S. Cl. 357—30 **2 Claims**



1. A III-V photocathode comprising
host crystal ofsubstantially pure III^4V material;
a series of graded layers of transition material approximately 2 microns thick and having a stochiometric formula III_X. $^A III_{1-x}{}^B V^M$ deposited on said host crystals, where the value of x is varied in steps to provide an abrupt increase of 8–10 mole percent of III^4-V in each successive graded layer as compared with the underlying material, the last of

said graded layers containing between 30 - 58 mole percent of III-V;

final layer of said transition material containing 40 - 65 percent of III-V approximately 5 microns thick deposited over the last of said graded layers; and

a photocathode layer composed of III-V compounds at least one of which is different from those in said transition material deposited on said final layer and activated with cesium vapor and oxygen.

4,053,921

SEMICONDUCTOR COMPONENT HAVING EMITTER SHORT CIRCUITS

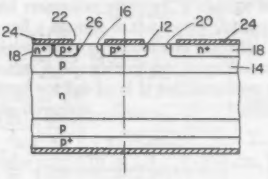
André Jaecklin, Ennetbaden, and Thomas Vlasak, Birr, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Oct. 15, 1975, Ser. No. 622,496

Claims priority, application Switzerland, Dec. 3, 1974, 16055/74

Int. Cl.² H01L *29/74, 29/747*

U.S. Cl. 357—38 **7 Claims**



1. A shorted emitter structure for a semiconductor device, said semiconductor device comprising:

a wafer of semiconductor material having first and second parallel surfaces and a layer of one semiconductor material of a first conductivity type extending from said first surface;

a center gate region of said first conductivity type generally located at the center of said first surface;

an annular cathode region of semiconductor material of a second conductivity type extending from said first surface and surrounding and spaced from said center gate region;

a plurality of short circuit elements comprising angular segments of said first conductivity type disposed within interior radial regions of said annular cathode region but spaced from said annular cathode region, said short circuit elements having inner diameter regions which are substantially continuous with the inner diameter of said annular cathode region; and

an annular cathode metallizing ring which extends from about the inner diameter of said cathode region and said annular segments to about the outer diameter of said cathode region and extending across and electrically connecting said annular segments of said first conductivity type to said cathode region of said second conductivity type.

4,053,922

LIGHT TRIGGERED THYRISTOR HAVING CONTROLLED TURN ON DELAY

Armand P. Ferro, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

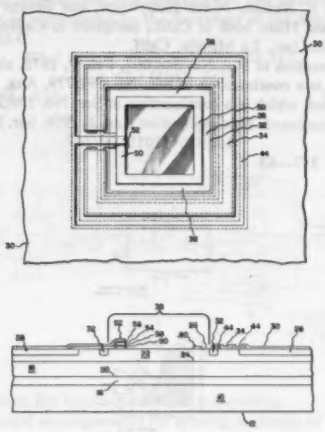
Filed May 19, 1976, Ser. No. 687,986

Int. Cl.² H01L *29/74*

U.S. Cl. 357—38 **11 Claims**

1. In a radiation triggered thyristor having an anode, a cathode and a radiation sensitive gate region, the improvement for providing adjustable turn-on time comprising:

electrode means in said gate region surrounding at least a portion of said gate region and essentially isolated from said cathode region, said electrode means adapted to collect at least a portion of the current generated in said gate region by the incidence of radiation thereon; and



adjustable resistor means connected between said electrode means and said cathode.

4,053,923

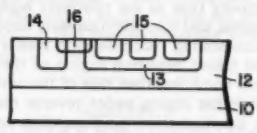
INTEGRATED LOGIC ELEMENTS WITH IMPROVED SPEED-POWER CHARACTERISTICS

S. Daniel Kang, Houston, Tex., assignor to Motorola, Inc., Chicago, Ill.

Filed Sept. 23, 1976, Ser. No. 726,083

Int. Cl.² H01L *27/04*

U.S. Cl. 357—51 **2 Claims**



1. In a monolithic semiconductor circuit comprising a semiconductor body of a first conductivity type,

a pair of mutually spaced regions in said body and each of a second conductivity type, said regions constituting respectively the emitter and collector regions of a lateral transistor,

said collector region having therewithin a region of said first conductivity type constituting the collector of an inversely operated vertical transistor,

said collector region of said lateral transistor constituting the base region of said vertical transistor,

said semiconductor body constituting the base region of said lateral transistor and the emitter region of said vertical transistor,

said collector and base regions of said vertical transistor having therebetween a collector base P-N junction,

said base and emitter regions of said vertical transistor having therebetween a base-emitter P-N junction,

conductive means for reverse biasing said collectorbase junction and forward biasing said base-emitter junction,

conductive means for receiving a control signal at the base of said vertical transistor,

wherein the improvement comprises a shunt resistive means connected between said collector and said emitter of said lateral transistor for increasing the switching speed of said circuit.

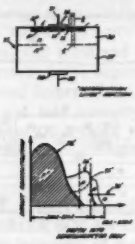
4,053,924
ION-IMPLANTED SEMICONDUCTOR ABRUPT JUNCTION

Leonard F. Roman, North Hollywood, and George H. Elliott, Granada Hills, both of Calif., assignors to California Linear Circuits, Inc., La Mirada, Calif.

Continuation of Ser. No. 548,067, Feb. 7, 1975, abandoned, which is a continuation of Ser. No. 391,779, Aug. 27, 1973, abandoned, which is a continuation of Ser. No. 196,281, Nov. 8, 1971, abandoned. This application Aug. 2, 1976, Ser. No. 710,749

Int. Cl.² H01L *29/167*

U.S. Cl. 357—63 **12 Claims**



1. An ion implanted PN junction, having a forward biased depletion region when forward bias is applied across the junction, a reverse biased depletion region when reverse bias is applied across the junction, and a steady state reverse current characteristic, said junction comprising:

a first region and a second region, said first region being relatively highly doped when compared to said second region and being adjacent to said second region, said second region being relatively lightly doped when compared to said first region and being of opposite conductivity type, and a thin intermediately doped recombination layer immediately adjacent said junction and of the same conductivity type as the relatively highly doped one of said regions, said thin intermediately doped recombination layer constituting recombination means overlapping the forward biased depletion region of the junction with a thickness much less than that of the reverse biased junction depletion region under reverse bias, for providing dopant ion-recombination-generation centers so located that the forward and reverse recovery times of the junction are improved without degrading the steady state reverse current characteristics of the junction.

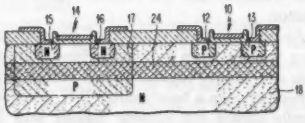
4,053,925
METHOD AND STRUCTURE FOR CONTROLLNG CARRIER LIFETIME IN SEMICONDUCTOR DEVICES

Peter Burr, Winchester, England; Richard C. Joy, Hopewell Junction, and James F. Ziegler, Putnam Valley, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Aug. 7, 1975, Ser. No. 602,710

Int. Cl.² H01L *21/76, 21/265, 29/167, 29/32*

U.S. Cl. 357—64 **14 Claims**



1. An integrated semiconductor device in a semiconductor substrate of monocrystalline semiconductor material of a first type conductivity, regions of a second opposite type conductivity, complementary field effect transistors in the substrate and in the regions, the improvement comprising

at least one region of implanted inert atoms within the device, said inert atoms selected from the group consisting of argon, krypton and xenon that reduce the gain of parasitic transistor action by reducing the minority carrier lifetime, said implanted inert atoms in said region forming substantially immobile recombination centers, said region subjected to a high temperature anneal that substantially recrystallizes any lattice damage resulting from the implantation step, the concentration of said implanted inert atoms being substantially greater than the density of any remaining lattice damage sites.

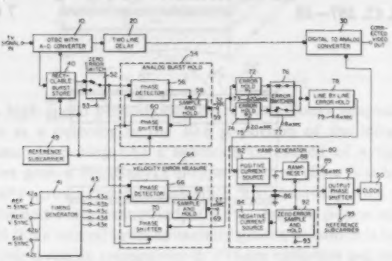
4,053,926
TIMING ERROR COMPENSATOR

Maurice G. Lemoine, and Leonard A. Pasdera, both of Redwood City, Calif., assignors to Ampex Corporation, Redwood City, Calif.

Filed Mar. 3, 1975, Ser. No. 554,886

Int. Cl.² H04N *5/785;* H03K *13/02*

U.S. Cl. 358—8 **31 Claims**



25. Apparatus for time displacing a signal while it is being converted from a digital form to an analog form comprising a digital to analog converter responsive to clock signals to receive and convert a series of digital signals to an analog representation, an adjustable time base clock signal generator for generating a clock signal having a time base dependent on the time base of a time base control signal, said clock signal coupled to said digital to analog converter to command it to convert said series of digital signals to an analog representation, and means for generating said time base control signal.

4,053,927
CHROMINANCE AMPLIFIER CONTROL CIRCUIT PROVIDING SIMULTANEOUS ADJUSTMENT OF GAIN AND DC LEVEL

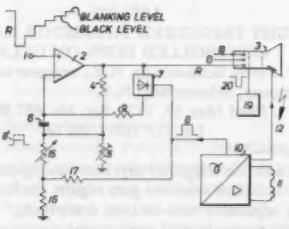
Burchard Schmidtmann, Barsinghausen, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Mar. 9, 1976, Ser. No. 665,164

Claims priority, application Germany, Mar. 18, 1975, 2511707

Int. Cl.² H04N *9/535, 9/20*

U.S. Cl. 358—29 **6 Claims**



1. In a circuit for use in a color television receiver, equipped

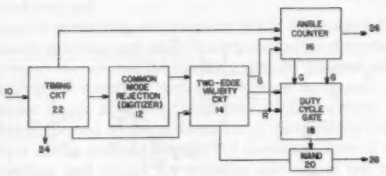
with a precision-in-line color picture tube containing three electron guns disposed in a line, each gun being associated with a respective picture color and including a cathode connected to receive a respective chrominance signal associated with its respective picture color, the signal applied to the cathode controlling the amplitude of the electron beam produced by the associated gun, the circuit including three amplifiers each connected to amplify a respective chrominance signal and having an output connected to the cathode of a respective associated electron gun, the signal at the output of each amplifier being held at a constant voltage level during each horizontal blanking period by means of a keying pulse, and each amplifier being connected with a respective feedback path including an amplification determining resistance network, the resistance value of which determines the gain of its associated amplifier, the improvement wherein each said resistance network includes at least one variable resistance which is adjustable to vary the resistance presented by said network, and said circuit comprises means connected for coupling such keying pulses into each said resistance network in a manner such that variation of said variable resistance in any respective one of said networks will simultaneously produce, for said amplifier associated with said respective network, a change in the gain of said amplifier and a change in the direct voltage level of the chrominance signal at the output of said amplifier in a direction such that increases in the gain of said amplifier coincide with shifts in the direct voltage level at said amplifier output in the positive polarity direction.

4,053,928

EDGE DETECTION ANALYZER

Criley Orton, Ridgecrest, Calif., and Richard G. Bahler, Holyoke, Colo., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 23, 1976, Ser. No. 708,253
Int. Cl.² H04N 7/00
U.S. Cl. 358—96 **5 Claims**



1. Apparatus to be coupled to a source of video signals that are responsive to a field-of-interest, which will detect video contrast levels in the signals that correspond to contrast edges in the field-of-interest even though the contrast level may be less than full scale, and, further, which will measure the angle of the contrast edge, comprising:

circuit means for processing said signals to obtain said levels, and comparing the average of said levels with said signals to provide an output centered around zero level value that identifies the existence of at least one said contrast edge;

circuit means for rejecting said output when more than one side edge is identified during a preselected period;

electronic counting means for measuring the angle of said edge identified by an output that is not rejected by said rejecting means;

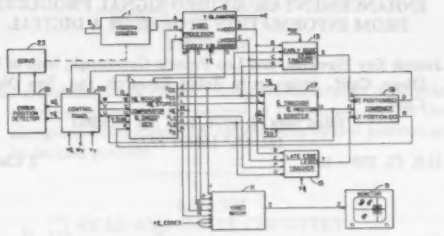
timing means coupled to said processing and comparing means, said rejecting means, and said measuring means for controlling the function of each in accordance with a timing sequence.

4,053,929

CONTOUR FITTING PICTORIAL TRACKING GATE

Robert H. Collins, III; William J. Steele, and Albert L. Thomas, Jr., all of Birmingham, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 7, 1969, Ser. No. 815,517
Int. Cl.² H04N 7/18
U.S. Cl. 358—126 **10 Claims**



1. A system for tracking a target comprising:

a directional sensing means for sensing an image of at least a portion of the target, said sensing means having outputs which are video signals in accordance to the image sensed,

a video processor having inputs connected to outputs of said sensing means, said processor including means for clamping to ground the video signal at a predetermined position of a contrast area on the image,

circuit means connected to outputs of said processor so as to generate at its outputs, tracking gates about said contrast area,

tracking means connected to the outputs of said circuit means and said processor so as to track a center position of said contrast area and provide orthogonal error signals of the position of said contrast area, and

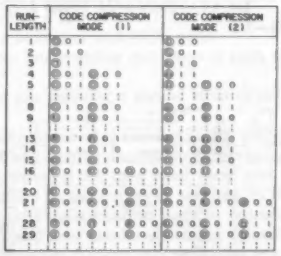
servoing means connected to said orthogonal error signals and to said directional sensing means for positioning the sensing means so that the image sensed will include said contrast area.

4,053,930

METHOD AND DEVICE FOR CODING COMPRESSING VIDEO INFORMATION

Mutsuo Ogawa, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Dec. 28, 1973, Ser. No. 429,147
Claims priority, application Japan, Dec. 31, 1972, 47-313
Int. Cl.² H04N 7/12
U.S. Cl. 358—133 **8 Claims**



1. A method for coding and compressing video information comprising the steps of

a. representing by a coded signal each run-length of white or black elementary areas which appear in succession in video information,

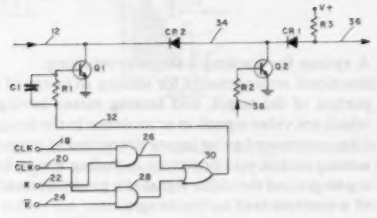
b. replacing a bit in at least one bit place in said coded signal with a discrimination signal which discriminates said coded signal as a signal representing white or black elementary areas, and

c. weighting said discrimination bits by the same weights used for weighting the bits of the coded signals representing run-lengths.

4,053,931
ENHANCEMENT OF A VIDEO SIGNAL PRODUCED FROM INFORMATION STORED IN A DIGITAL MEMORY

Joseph Key Hawkins, and Leo Francis Cavanaugh, both of San Diego, Calif., assignors to Robot Research, Inc., San Diego, Calif.

Filed Sept. 2, 1976, Ser. No. 719,907
Int. Cl.² H04N 7/12
U.S. Cl. 358—134 **2 Claims**



1. Apparatus for producing a video signal from information stored in a digital memory, said stored information representing the video signal intensity in each of a plurality of picture element locations within a plurality of scan lines, comprising,

means for producing an analog video signal for display from said stored information,

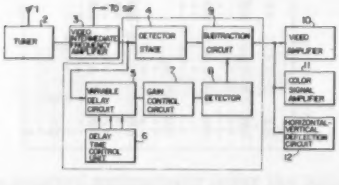
wherein the improvement comprises:

means for blanking said analog video signal during the first half of each picture element location during alternately displayed lines and for blanking said analog video signal during the last half of each picture element location during the remaining displayed lines.

4,053,932
GHOST SIGNAL ELIMINATING SYSTEM

Namio Yamaguti; Minoru Miyata, and Keisuke Yamamoto, all of Ibaragi, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 1, 1975, Ser. No. 636,720
Claims priority, application Japan, June 10, 1974, 49-65738; June 10, 1974, 49-65739; June 10, 1974, 49-65740
Int. Cl.² H04N 5/21; H04B 1/12
U.S. Cl. 358—167 **6 Claims**



1. A ghost signal eliminating system comprising:

a surface wave delay circuit for delaying a video signal by a delay time of a ghost signal with respect to a true image, said surface wave delay circuit having a plurality of coarse adjustment terminals for coarsely adjusting the delay time and a plurality of fine adjustment terminals for finely adjusting the delay time;

a subtraction circuit for subtracting the video signal delayed by said surface wave delay circuit from the original video signal;

a fine adjustment switching circuit for switching said plurality of fine adjustment terminals of said surface wave delay circuit;

a coarse adjustment switching circuit for switching said plurality of coarse adjustment terminals of said surface wave delay circuit;

a first level detection means for producing a fixed voltage at a corresponding one of a plurality of output terminals thereof depending on the level of a varying control voltage applied thereto;

a voltage comparator means for subtracting said fixed voltage developed at the corresponding one of the output terminals of said first level detection means from said varying control voltage;

a second level detection means for producing a fixed voltage at a corresponding one of a plurality of output terminals thereof depending on the level of the output voltage from said voltage comparator means;

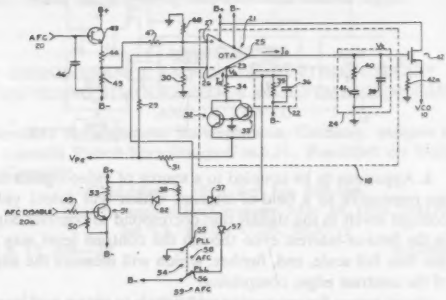
a means for applying the fixed voltage developed at the output terminals of said first level detection means to a plurality of control terminals of said coarse adjustment switching circuit; and

a further means for applying the fixed voltage developed at the output terminals of said second level detection means to a plurality of control terminals of said fine adjustment switching circuit.

4,053,933
ADAPTIVE PHASE LOCKED LOOP FILTER FOR TELEVISION TUNING

Johnny Collins, Oak Park, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Nov. 2, 1976, Ser. No. 737,945
Int. Cl.² H03B 3/04; H04N 5/44
U.S. Cl. 358—191 **11 Claims**



1. In a phase locked loop of the type having a phase comparator developing an error signal for controlling the output of a voltage controlled oscillator through a low-pass filter, the improved low-pass filter comprising:

amplifying means having a directional control input and a gain control input both connected for receiving said error signal, said amplifying means being operable for developing an output current having a direction and duty cycle determined by, respectively, the polarity of said error signal applied to said directional control input and the pulse width of said error signal applied to said gain control input; and

a capacitive network connected for charging and discharging in response to said output current for controlling the output of said voltage controlled oscillator.

4,053,934

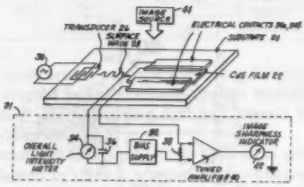
MEASURING THE QUALITY OF IMAGES

Philipp G. Kornreich, North Syracuse, and Stephen T. Kowel, Liverpool, both of N.Y.

Continuation-in-part of Ser. No. 434,102, Jan. 17, 1974, abandoned, Ser. No. 493,990, Aug. 1, 1974, and Ser. No. 499,606, Aug. 22, 1974, said Ser. No. 434,102, is a continuation-in-part of Ser. No. 319,680, Dec. 29, 1972, abandoned, said Ser. No. 493,990, is a continuation of said Ser. No. 319,680, said Ser. No. 499,606, is a continuation-in-part of said Ser. No. 434,102, said Ser. No. 319,680, and Ser. No. 365,054, May 30, 1973, Pat. No. 3,836,712, which is a division of Ser. No. 319,680. This application May 12, 1975, Ser. No. 576,433

Int. Cl.² H04N *3/14;* G02F *1/11*

U.S. Cl. 358—213 **60 Claims**



1. Apparatus for detecting the sharpness of an image comprising:

a medium having a measurable property which varies as a function of the intensity pattern of an image formed thereon and as a function of strain disturbances in the medium;

means for forming a selected image on the medium;

means for causing a selected strain disturbance in the medium which propagates along the image formed on the medium; and

means for measuring said property while the image is formed on the medium and while the selected strain disturbance is present therein and for deriving thereby a signal which is a Fourier transform representation of an aspect of the entire image and which represents the sharpness of the image formed on the medium but is substantially independent of the average intensity of the image formed on the medium and means for utilizing said signal for control purposes.

4,053,935

TAPE CASSETTE WITH FLEXIBLE APERTURE CLOSURE

Haruo Shiba, Tokyo, Japan, assignor to TDK Electronics Co., Ltd., Tokyo, Japan

Filed Apr. 22, 1976, Ser. No. 679,341

Claims priority, application Japan, Apr. 22, 1975, 50-54882[U]

Int. Cl.² G11B *15/04*

U.S. Cl. 360—60 **2 Claims**

1. A tape cassette comprising:

a cassette body,

a bias changeover slot disposed in the cassette body,

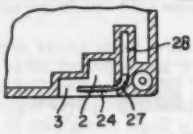
an accidental erasure preventive slot disposed in the cassette body adjacent to the bias changeover slot,

a storage slot disposed adjacent to the accidental erasure preventive slot,

the storage slot having a curved portion,

an elongated cover element disposed at least partially in the storage slot,

the elongated cover element having a first position blocking the accidental erasure preventive slot and a second position opening he accidental erasure preventive slot,



the elongated cover element being bendable so as to be able to travel in the curved portion of the storage slot as the elongated cover element is moved from its first position to its second position.

4,053,936

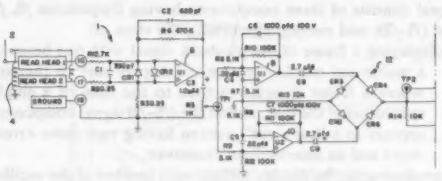
READ AND WRITE CIRCUITRY

Tilman H. Foust, Jr., Gaithersburg, Md., assignor to AMP Incorporated, Harrisburg, Pa.

Filed June 3, 1976, Ser. No. 692,411

Int. Cl.² G11B *15/12, 5/02*

U.S. Cl. 360—62 **4 Claims**



1. A read circuit and a write circuit for a magnetic head wherein the circuits are isolated one from the other during operation of either one of said circuits, the combination comprising:

a read circuit provided with an input data line receiving read input signals,

the output of said data line being supplied to an operational amplifier, a rectifier bridge and a peak detector in series producing an analog signal having peaks occurring at flux reversals of said read input signals,

converter means for converting said analog signal to serial binary signals suitable for data reading,

a timer input to said converter means for determining the bit cell time of said binary signals,

the output of said converter means being suitable for data reading,

a write circuit provided with a pair of positive NOR gates, the output of a first of said NOR gates connected to an input of a second of said NOR gates,

a clock input line enabling one input of each of said NOR gates,

a data input line enabling a second input of said first NOR gate,

a first switch referenced to minus potential connected to said read head and causing current flow from ground to minus potential through the read head upon said first switch being enabled by the output of said first NOR gate,

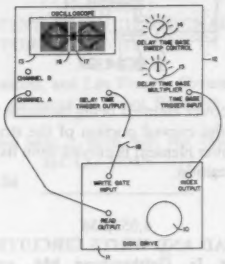
a second switch referenced at positive potential and connected to said read head and causing current flow from positive potential through said read head to ground upon enabling of said second switch by the output of said second NOR gate, and

means electrically isolating said first and second switches from said read circuit and means electrically isolating said read circuit from current flow to said read head during operation of said write circuit.

4,053,937
CALIBRATION TIMING BANDS

William Hugh Hersey, Jr., Cypress, Calif., assignor to Mohawk Data Sciences Corporation, Herkimer, N.Y.

Filed Feb. 9, 1976, Ser. No. 656,505
Int. Cl.[2] G11B 21/10; G04F 8/00
U.S. Cl. 360—77 2 Claims



1. A method of preparing an alignment disc pak in which first and second signals of different frequencies (*f*1 and *f*2) are recorded in eccentric bands at a selected track on the disc such that when the recorded signals are played back, the playback signal consists of three components having frequencies *f*1, *f*2 and (*f*1–*f*2); said method comprising the steps of:

displaying a frame of the playback signal with one beam of a multibeam oscilloscope on the display surface thereof, where a frame is equal in time to the time of a single revolution of the disc, so that the (*f*1–*f*2) signal component appears as a "cat's eye" pattern having two outer crossovers and an intermediate crossover;

producing on the display surface with another of the oscilloscope beams a time marker;

measuring the distance Sp between the intermediate crossover and one of the outer crossovers;

positioning said time marker to first one and then the other of two positions on either side of the intermediate crossover, the two positions being defined by the formula (Gc − Sp ± 0.2/2) where Gc is the geometric center of the displayed frame of the playback signal;

producing first and second narrow timing bands on either side of the intermediate crossover by erasing the recorded signals only in radial sectors of the disc corresponding in position to the two positions of the time marker and to the width of such marker.

4,053,938
TEMPERATURE SENSING TRANSFORMER PRIMARY SWITCH

Michael J. Estes, Waukesha, Wis., assignor to RTE Corporation, Waukesha, Wis.

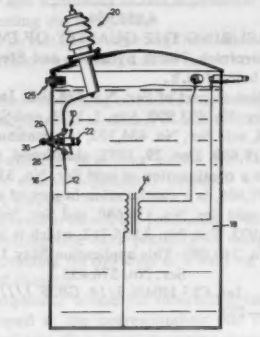
Filed Apr. 16, 1975, Ser. No. 568,655
Int. Cl.[2] H02H 7/04
U.S. Cl. 361—37 23 Claims

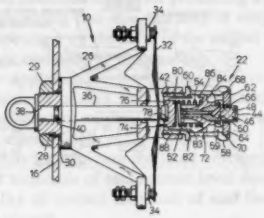
1. A temperature sensing assembly for opening a distribution transformer snap action type primary switch when the temperature of the fluid in the transformer exceeds the maximum safe operating temperature of the transformer, said assembly comprising:

a housing mounted on the primary switch below the level of the dielectric fluid in the transformer,

a temperature responsive actuator positioned in said housing, said actuator being responsive to the maximum safe operating temperature of the transformer,

and bias means positioned between said actuator and switch whereby the motion of said actuator will compress the bias means and open the primary switch when the compressive force in the bias means is sufficient to actuate the primary switch.

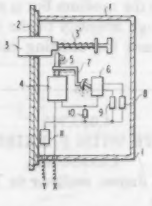




4,053,939
ELECTRIC LOCK SYSTEM

Shunsaku Nakauchi, Mitaka, and Akifusa Takahashi, Tokyo, both of Japan, assignors to Kokusai Gijutsu Kaihatsu Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 24, 1975, Ser. No. 634,388
Claims priority, application Japan, Nov. 25, 1974, 49-134375; Nov. 25, 1974, 49-134376
Int. Cl.[2] H01H 47/00
U.S. Cl. 361—171 6 Claims

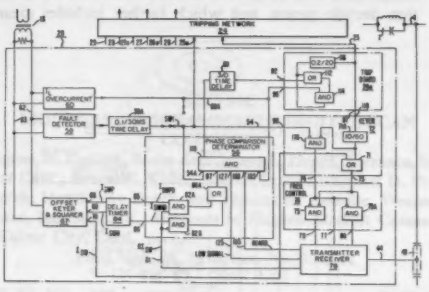


1. An electro-mechanical lock system comprising, a latch, a pair of supply terminals adapted to be connected to a source of remote power, a self-sustaining solenoid having a coil and a core, said core having two self-sustaining positions locking and unlocking said latch respectively, and said coil being connected to receive power supplied to said pair of supply terminals, impedance changing means connected in circuit with said pair of terminals and said coil for altering the impedance between said pair of terminals when said core moves from one self-sustaining position to another self-sustaining position, a remote control circuit including at least one power source and one measuring device, said remote control circuit being connected to said pair of terminals by a pair of wires.

4,053,940
MODIFIED OFFSET KEYING APPARATUS FOR PHASE COMPARISON RELAYING

Walter L. Hinman, Jr., New Providence, and Russell W. Gonnam, Morris Plains, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 20, 1976, Ser. No. 716,045
Int. Cl.² H02H 7/26, 3/28
U.S. Cl. 361—68 **8 Claims**



1. Phase comparison relaying apparatus for protecting an alternating current power transmission line including at least one conductor interconnecting first and second busses, said apparatus comprising:

a. first circuit means, cooperatively associated with said first bus, adapted to receive a signal representative of the instantaneous magnitude of current flowing in the conductor, for establishing a first set of constant upper and lower limits of a current security margin, both of said first set limits being established to one side of the effective zero axis of the waveform of the signal to be received and for generating

i. a first output signal when the instantaneous magnitude of the received signal is between said upper and lower limits of said security margin,

ii. a second output signal when the instantaneous magnitude of the received signal is above said limits of said security margin, and

iii. a third output signal when the instantaneous magnitude of the received signal is below said limits of said security margin;

b. second circuit means, cooperatively associated with said first bus, adapted to receive the signal representative of the instantaneous magnitude of current flowing in the conductor, for establishing a first constant keying threshold limit to the other side of the effective zero axis of the waveform of the received signal and for generating

i. a first output keying signal when the instantaneous magnitude of the received signal is above said first keying threshold limit, and

ii. a second output keying signal when the instantaneous magnitude of the received signal is below said first keying threshold limit;

c. third circuit means, cooperatively associated with said second bus, adapted to receive a signal representative of the instantaneous magnitude of current flowing in the conductor, for establishing a second set of constant upper and lower limits of a current security margin, both of said limits being established to one side of the effective zero axis of the waveform of the received signal and for generating

i. a first output signal when the instantaneous magnitude of the received signal is between said upper and lower limits of said security margin,

ii. a second output signal when the instantaneous magnitude of the received signal is above said limits of said security margin, and

iii. a third output signal at the other of its said outputs when the instantaneous magnitude of the received signal is below said limits of said security margin; and

d. fourth circuit means, adapted to receive the signal representative of the instantaneous magnitude of current flowing in the conductor, for establishing a second constant keying threshold limit to the other side of the effective zero axis of the waveform of the received signal and for generating

i. a first output keying signal when the instantaneous magnitude of the received signal is above said second keying threshold limit, and

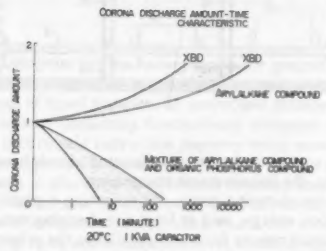
ii. a second output keying signal when the instantaneous magnitude of the received signal is below said second keying threshold limit; and

wherein said first and second keying threshold limits are established to be of different magnitudes.

4,053,941
OIL IMPREGNATED ELECTRIC DEVICE

Tokihiko Shimizu, Takatsuki; Yasuo Iijima, Kobe, and Makoto Kusano, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed June 6, 1975, Ser. No. 584,356
Claims priority, application Japan, June 20, 1974, 49-70459; June 20, 1974, 49-70460
Int. Cl.² H01G 4/22
U.S. Cl. 361—319 **6 Claims**

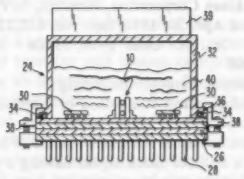


1. An oil impregnated electric device containing an element comprising at least one pair of electrodes and at least one sheet of polyolefin film, wherein said element is impregnated with a mixture comprising 1,1-phenylxylyl ethane and from 10 – 80 volume % of an organic phosphate.

4,053,942
DEVICE FOR REMOVING LOW LEVEL CONTAMINANTS FROM A LIQUID

William E. Dougherty, Jr., Wappingers Falls; Lawrence V. Gregor, Hopewell Junction; Donald L. Klein; Thomas F. Redmond, both of Poughkeepsie, and Morton D. Reeber, Shrub Oak, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed June 28, 1976, Ser. No. 700,653
Int. Cl.² H05K 7/20
U.S. Cl. 361—385 **8 Claims**



1. In a liquid cooled semiconductor package assembly hav-

ing at least one semiconductor device carrier substrate, at least one semiconductor device mounted on the substrate, a cover for forming an enclosure about said semiconductor device, and a cooling liquid in the enclosure adapted for cooling the device, the improvement comprising

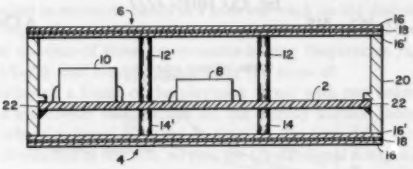
a means to trap and hold contaminants from said cooling liquid, said means including an electrical heating element immersed in the cooling liquid, and a confining means immersed in the cooling liquid and adapted to enclose and maintain a pulsating vapor bubble generated by said heating element, said heating element disposed within said confining means and at least partially immersed in said cooling liquid, means to permit controlled partial escape of a portion of the vapor bubble and ingress of cooling fluid to said confining means.

4,053,943

TECHNIQUE FOR DAMPING ELECTRONIC MODULE PRINTED WIRING BOARD

Lee Robert Galvin, Scottsdale, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Filed Jan. 22, 1976, Ser. No. 651,654
Int. Cl.² H02B *1/62*
U.S. Cl. 361—399 **1 Claim**



1. In an apparatus for damping printed circuit board vibration energy, the improvement comprising:

at least one damping means for absorbing a portion of the vibration energy, said at least one damping means being positioned remote from and parallel to the printed circuit board and comprising a lamination including a layer of high hysteresis elastomer;

at least one post means for connecting said at least one damping means to the printed circuit board, each of said at least one post means having two extremities, one of said extremities being fastened to the printed circuit board and the other of said extremities being fastened to said at least one damping means for providing mechanical energy transfer from the printed circuit board to said at least one damping means; and

frame means for structurally integrating the printed circuit board and said at least one damping means, said frame means being fastened to the perimeter of the printed circuit board and to the perimeter of each of said at least one damping means.

4,053,944

MICROPROCESSOR CONTROLLED SIGNAL PATTERN DETECTOR

Jerry Duane Dixon, Boca Raton, Fla., assignor to International Business Machines Corporation, Armonk, N.Y.

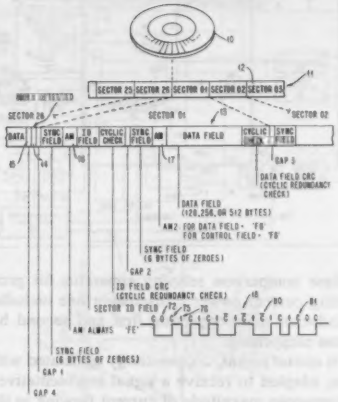
Filed Apr. 30, 1976, Ser. No. 682,225
Int. Cl.² G06F *1/04, 13/04*
U.S. Cl. 364—200 **7 Claims**

1. A signal pattern detector including:

a source of information comprised of a sequence of signals having first or second binary states;

timing means associated with said source of information for generating a control clock signal having a predetermined frequency;

a stored program processor, including a processor clock, having a frequency different from said predetermined frequency, and defining a processor cycle, cycle control means connected to said processor clock for inhibiting or initiating a processor cycle, addressable storage for program instructions, instruction access means normally accessing instructions from said addressable storage in sequence, and instruction decode means for storing instructions accessed from said storage means and providing a function signal identifying an instruction to be executed during said processor cycle, wherein each processor cycle commences with transfer of an instruction to said instruction decode means, and which further includes means,



responsive to a first function signal from said instruction decode means, for accessing a second instruction from said addressable storage, and connected to said cycle control means to inhibit commencement of the next processor cycle,

means connected to said cycle control means and connected and responsive to said control clock signal, for initiating the next processor cycle; and

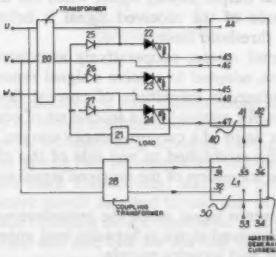
signal storage means connected and responsive to said instruction decode means, providing a function signal for said second instruction, for storing and indicating the state of each signal from said source of information.

4,053,945

MASTER-SLAVE CONTROL METHOD AND DEVICE FOR A MULTIPHASE CIRCUIT

Guy H. Dumas, 42 rue du Pere Corentin, 75014 Paris, France

Filed Jan. 5, 1976, Ser. No. 646,835
Claims priority, application France, Feb. 18, 1975, 75.05054
Int. Cl.² H02M *7/155*
U.S. Cl. 363—129 **1 Claim**



1. A master-slave device for controlling the power of a multiphase thyristor bridge comprising:

a single means for forming a master-pulse having a deter-

mined and adjustable phase relationship with one phase of the multiphase feed voltage;

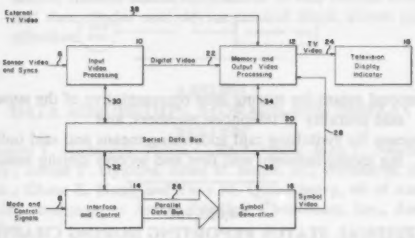
delay means in parallel or serial-parallel in order to provide a number of slave-pulses equal to the number of phases of the multiphase feed voltage;

coupling means comprising photocouplers for applying said slave-pulses to the respective gates of the thyristors of the bridge whereby the control circuit is insulated from the charge circuit.

4,053,946
MODULAR PROGRAMMABLE DIGITAL SCAN CONVERTER

Eugene W. Opittek, Santa Ana; James L. Heard, Torrance, both of Calif.; Bruce W. Keller, Scotland, Ark.; Michael D. Pruznick, Huntington Beach, and Thomas A. Bosseler, Westminster, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Nov. 24, 1975, Ser. No. 634,711
Int. Cl.² G06F *3/05*
U.S. Cl. 364—200 **10 Claims**



1. A modular programmable digital scan converter adapted for responding to applied control signals and to sensor data of various formats so as to provide display data, said scan converter comprising:

input video processing means for converting the sensor data into digital signals and for integrating and detecting said digital signals to produce processed output digital signals, said input video processing means comprising a plurality of modules which have means for responding to applied digital set-up and address words so as to implement processing parameters for the converting, integrating and detecting operations;

memory and output processing means for storing said output digital signals and for reading out and processing said stored data so as to provide display data, said memory and output processing means comprising a plurality of modules which contain means for responding to applied digital set-up and address words such that the format and data rates for storing and reading out said output digital signals are selected in response to the set-up and address words; and

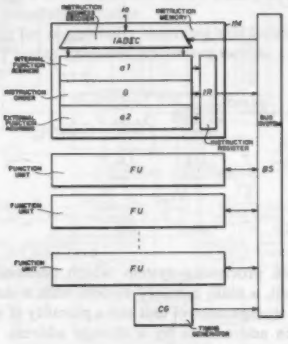
interface and control means, responsive to the control signals, for applying the digital set-up and address words to the modules of said input video processing means and to the modules of said memory and output processing means, said interface and control means including a programmable controller which is programmed to provide a selected relationship between the control signals and the digital set-up and address words; whereby

the specific processing parameters implemented by the input video processing means, and the storage and read out rates and formats of said memory and output processing means are determined by said programmed controller.

4,053,947
METHOD AND APPARATUS FOR EXECUTING SEQUENTIAL DATA PROCESSING INSTRUCTIONS IN FUNCTION UNITS OF A COMPUTER

Karl-Johan Werner Carlsson, Solna, and Erik Ivar Sjöqvist, Farsta, both of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Apr. 30, 1976, Ser. No. 682,095
Claims priority, application Sweden, May 14, 1975, 7505552
Int. Cl.² G06F *9/10*
U.S. Cl. 364—200 **3 Claims**



1. In a computer system having means for generating timing pulses which determine sequentially occurring instruction-read phases of equal duration, an instruction memory for storing instructions containing function-unit addresses and function-unit orders, said instruction memory being provided with means for sequentially reading instructions during successive read phases, a plurality of addressed function units for performing functions in accordance with received function-unit orders, said function units including means for receiving and transmitting data, and a bus system for transferring the function-unit addresses and orders from the instruction memory to the function units and for transferring data between the function units, the instructions being of two types, the first type having the steps of selecting by means of the function-unit address part of the instruction one of said function units and to order the performance of a function as determined by a function-unit order part of the instruction, and the second type of instruction including steps of selecting two of said function units by means of two addresses in the function-unit address part of the instruction, to transfer data between the two selected function units through the bus system and to order the function unit which receives data to use the received data in the performance of a function determined by the function-unit order parts of the instruction, the execution period of the second type of instruction being divided into a first part during which one of the two addressed function units is ordered to transmit data, a second part during which actual data are transferred from said one of the function units to the bus system and a third part during which the other of the two function units receives the data from the bus system and performs the required function thereupon.

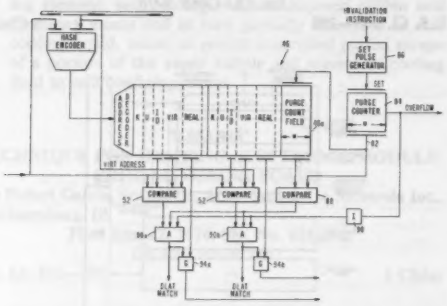
an improved method for decreasing the operating time for performing a mixed sequence of instructions of the first and second type for said system comprising the steps of performing an instruction of said first type during a said read phase associated therewith and performing an instruction of the second type during two of said read phases wherein the first part of said instruction of the second type is performed during the first read phase associated with said instruction of the second type and the second and third parts of said instruction of the second type are performed during the second of said read phases associated therewith.

4,053,948

LOOK ASIDE ARRAY INVALIDATION MECHANISM

Spurgeon Graves Hogan, and Carleton Edward Werve, both of Poughkeepsie, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed June 21, 1976, Ser. No. 697,817
Int. Cl.[2] G06F *13/00*; G11C *9/06*
U.S. Cl. 364—200 **3 Claims**



1. In a data processing system which contains a central processing unit, a main memory system with a main storage unit having a storage control unit and a plurality of addressable locations each addressable by a storage address, addressing means providing virtual addresses, and means for translating virtual addresses to real addresses including a plurality of sets of conversion tables, and improved translation control means comprising:

counter means for numbering purge instructions received by the memory system,

table means for storing a plurality of previously used virtual addresses each with a real address which constitutes a translation of that virtual address using one of said sets of conversion tables, said table means having a field coupled to the output of the counter means for storing the count of the counter means with each translation so that each time a translation is entered into the table means the count of the counter means at the time of entry is placed in the table means along with the translation,

comparator means for comparing the output of the counter means with the output of the field in the table means when a translation is read from the table means to provide a signal indicating a match or mismatch of the output of the counter means at the time the translation is read from the table means with the count stored with the translation, and,

gate means controlling the transmission of the translation to the memory system as a function of said signal from the comparator means whereby invalidated translations cannot be used to address the memory system.

4,053,949

TELEPHONE SYSTEM AND METHOD FOR PROVIDING DIRECTORY ASSISTANCE/INTERCEPT INFORMATION

Frank A. Recca, 6217 Lenneal Beach Drive, Orlando, Fla. 32810, and David J. Winter, 3218 Castle Oak Ave., Orlando, Fla. 32808

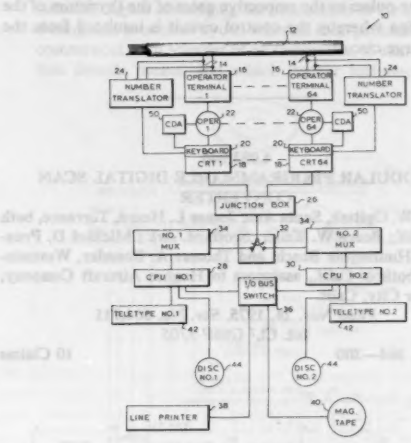
Filed Apr. 28, 1976, Ser. No. 681,035
Int. Cl.[2] G06F *15/16, 15/40*; H04M *3/60*
U.S. Cl. 364—200 **19 Claims**

1. A system for use with a telephone intercept or directory assistance operator position for providing an indication of the status of a preselected telephone number, such system comprising:

first means for storing data representative of the status of the plurality of telephone numbers;

means collocated with said operator position for addressing said data storing means;

means collocated with said operating position and said addressing means for receiving an output from such storing means and providing an indication of the status of said telephone number;



second means for storing data representative of the status of said plurality of telephone numbers; and

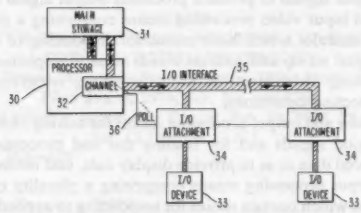
means for switching said addressing means and said indicating means between said first and second storing means.

4,053,950

RESIDUAL STATUS REPORTING DURING CHAINED CYCLE STEAL INPUT/OUTPUT OPERATIONS

Donall Garraid Bourke, Boca Raton, and Louis Peter Vergari, Palm Springs, both of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1976, Ser. No. 682,228
Int. Cl.[2] G06F *3/00*
U.S. Cl. 364—200 **4 Claims**



1. A data processing system comprising:

central storage means for data, program instructions, including operate I/O instructions, and peripheral device control blocks comprised of a plurality of control fields,

a peripheral device control unit including peripheral storage means for a peripheral device control block,

input/output interface logic including a data bus, address bus, and control signal lines interconnecting said central storage and peripheral device control unit,

a central processor connected to said central storage and said input/output interface logic, responsive to each said operate I/O instruction for initiating operation of said central storage and said interface logic for transferring to said peripheral device control unit a peripheral device control block,

said peripheral device control block including in the control fields, a first field comprised of a plurality of control bits, a central storage data address field specifying a data field in central storage involved in the data transfer, a count field specifying the amount of data to be transferred, and a chained device control block address field specifying the central storage location of a succeeding device control block to be transferred after use of the current device control block;

said peripheral device control unit including,

device control block access means connected to said input-/output interface logic, responsive to a predetermined state of one of said control bits and first signalling means indicating normal completion of use of the current device control block to access from said central storage the next succeeding device control block,

interrupt requesting means connected to said input/output interface logic, responsive to a second signalling means indicating unusual completion of use of the current device control block to signal an interrupt request to said central processor,

and status signalling means connected to said input/output interface logic, responsive to a predetermined state of another one of said control bits, and said second signalling means to inhibit operation of said interrupt requesting means, transfer status information to said central storage, and then render said device control block access means effective.

4,053,951

DATA ACQUISITION, STORAGE AND DISPLAY SYSTEM

Emmett L. Hudspeth; Philip C. Richardson; John L. Neathery, Jr.; Jerald P. Dykstra; Allen D. Boger, Jr.; William B. Sims, Jr.; Glenn E. Hunt, and Tony M. Quisenberry, all of Austin, Tex., assignors to Amsco/Medical Electronics, Inc., Austin, Tex.

Continuation of Ser. No. 385,699, Aug. 6, 1973, Pat. No. 3,940,742. This application Nov. 3, 1975, Ser. No. 628,216

The portion of the term of this patent subsequent to Feb. 24, 1993, has been disclaimed.

Int. Cl.[2] G06F *3/05*

U.S. Cl. 364—415 **14 Claims**

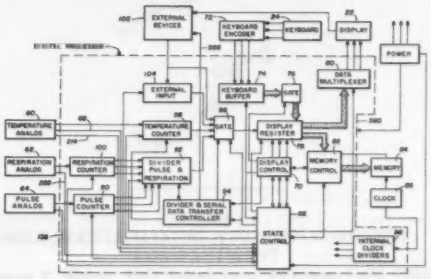
1. A medical data acquisition and storage system, comprising in combination:

display means for providing a visual presentation of input medical data,

input means reponsive to externally generated data and generating a plurality of input signals, said input means including means sensing the physiological variables of a patient and generating physiological input signals, and further including manual means for generating patient related input signals and system control signals,

processor means responsive to the physiological input signals, said processor means including arithmetic means for converting the physiological input signals into binary codes representing measured variables of a patient, wherein a predetermined set of binary codes represents each measured variable,

a register for sequentially receiving and holding each set of binary codes from said processor means,



memory means having multiple address locations for storing binary codes holding in said register, and

a controller connected to said processor means, said register and said memory, and including:

first means responsive to the patient related input signals and a control signal to sequentially transfer one set of binary codes for one measured variable from said processor means to said register;

second means responsive to the transfer of codes to said register to connect said register to said display means; and

third means responsive to a control signal and the connection of said register to said display means to transfer the binary codes from said register to said memory means.

DESIGNS

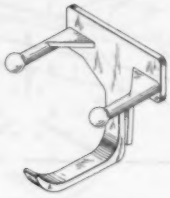
OCTOBER 11, 1977

246,011
PROTECTOR FOR MALE GENITALS
Harold Eckman, 49 Beacon St., Natick, Mass. 01760
Filed Dec. 29, 1975, Ser. No. 644,524
Term of patent 14 years
Int. Cl. D2—*01*
U.S. Cl. D2—1

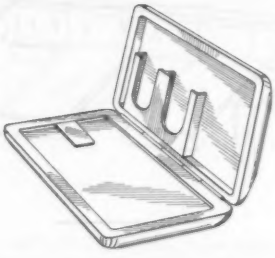
246,012
FACE GUARD ATTACHMENT FOR A HELMET
Kalevi Minette, P.O. Box 28, Forssa, Finland
Filed June 26, 1975, Ser. No. 590,682
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—233

246,013
HOLDER FOR A FLAGSTAFF OR THE LIKE
Alvin F. Morris, 2564 Navarra Drive, Carlsbad, Calif. 92008, and Richard E. Brown, Rte. 1, Box 69, Del Mar, Calif. 92014
Filed Jan. 14, 1976, Ser. No. 649,050
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400

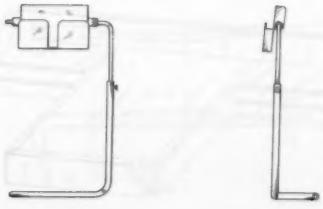
246,014
TENNIS BALL HOLDER
Kenneth H. Conrad, Bristol, Conn., assignor to Poly Medical Systems, Inc., Forestville, Conn.
Filed Oct. 9, 1975, Ser. No. 621,035
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400



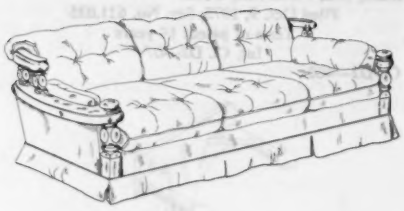
246,015
BELT BUCKLE HAVING A HIDDEN CURRENCY COMPARTMENT
Harmon T. Wayne, 9763 Towne Lane, El Cajon, Calif. 92021, and Donald Tortolani, 1951 El Monte Drive, Thousand Oaks, Calif. 91360
Filed Apr. 12, 1976, Ser. No. 675,910
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—406



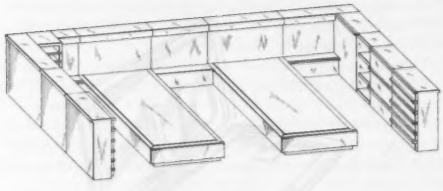
246,016
READING STAND OR THE LIKE
Joseph Daniel Brady, 7103 Inglewood Ave., Stockton, Calif. 95207
Filed Feb. 20, 1976, Ser. No. 659,654
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—25



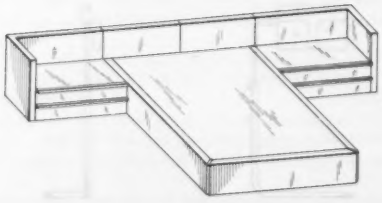
246,017
SEAT
Stanley P. Nash, Johnson Creek, Wis., assignor to Schweiger Industries, Inc., Jefferson, Wis.
Filed June 11, 1976, Ser. No. 695,095
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



246,018
COMBINED BED, SHELF AND CABINET UNIT
Franz Hero, and Karl Odermatt, both of Hinwil, Switzerland, assignors to Interlübke Gebr.Lübke KG, Rheda, Wiedenbruck, Germany
Filed Dec. 4, 1975, Ser. No. 637,858
Claims priority, application Germany, June 4, 1975, 762
Term of patent 14 years
Int. Cl. D6—*05*
U.S. Cl. D6—80

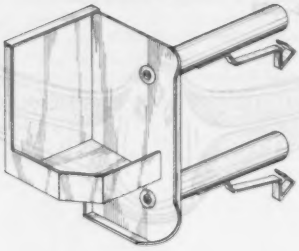


246,019
COMBINED BED AND HEADBOARD UNIT
Franz Hero, and Karl Odermatt, both of Hinwil, Switzerland, assignors to Interlübke Gebr.Lübke KG, Rheda, Wiedenbruck, Germany
Filed Dec. 4, 1975, Ser. No. 637,859
Claims priority, application Germany, June 4, 1975, 762
Term of patent 14 years
Int. Cl. D6—*05*
U.S. Cl. D6—80

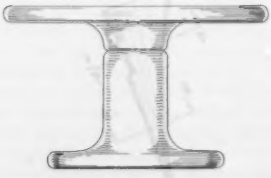


246,020
WALL MOUNTED HOLDER FOR BOTTLES OR THE LIKE
Marjorie Ann Gaines, 314 W. Van Wagoner, Flint, Mich. 48505
Filed Oct. 22, 1975, Ser. No. 624,999
Term of patent 14 years
Int. Cl. D23—*02*; D6—*04*
U.S. Cl. D6—86

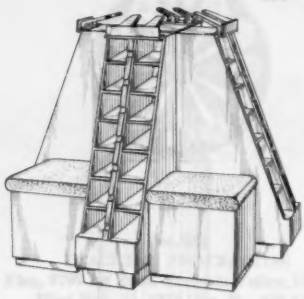
246,021
COMBINED LIQUID DISPENSER HOLDER AND TOILET PAPER ROLL HOLDERS
Theodore W. Richards, 1936 Sloat Blvd., San Francisco, Calif. 94116
Filed May 5, 1975, Ser. No. 574,742
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—91



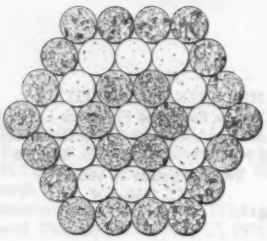
246,022
TABLE
Florence M. Mathur, 283 Mapledene Drive, Ancaster, Ontario, Canada
Filed Feb. 12, 1976, Ser. No. 657,400
Claims priority, application Canada, Jan. 29, 1976, 2901763
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—146



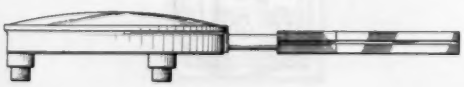
246,023
FOOTWEAR DISPLAY SYSTEM
Douglas C. Hillman, Orange, Conn., and Herbert J. Solomon, Beechhurst, N.Y., assignors to Uniroyal, Inc.
Filed Mar. 22, 1976, Ser. No. 669,126
Term of patent 14 years
Int. Cl. D20—*02*; D6—*04*
U.S. Cl. D6—189



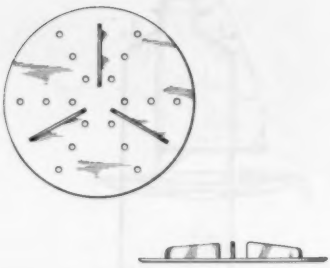
246,024
COASTER
William E. Hantke, 1076 Carol Lane, No. 25, Lafayette, Calif. 94549
Filed Oct. 2, 1975, Ser. No. 618,943
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—45



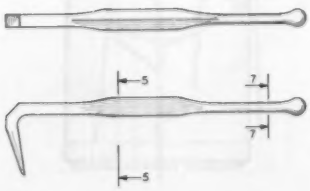
246,025
ELECTRIC CREPE PAN
Robert K. Gooden, South Gate, Calif., assignor to Grandinetti Products, Inc., Lynnwood, Calif.
Filed Dec. 31, 1975, Ser. No. 645,719
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—87



246,026
STORAGE BOWL LETTUCE SUPPORT OR LIKE ARTICLE
Alvin J. Stahel, Brighton, Minn., assignor to Ball Corporation, Muncie, Ind.
Filed Feb. 6, 1976, Ser. No. 655,948
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—130

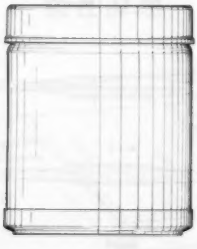


246,027
SOIL WORKING HAND TOOL
Richard O. Bartz, 7017 Mark Terrace Drive, Edina, Minn. 55435
Continuation-in-part of Ser. No. 532,676, Jan. 13, 1974, Pat. No. Des. 237,451. This application June 2, 1975, Ser. No. 583,050
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D8—11



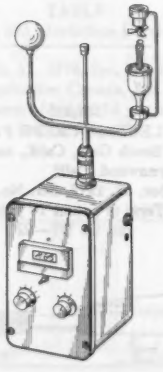
246,028
BOTTLE
Donald W. McNab, Long Beach, Calif., assignor to W. Braun Company, Chicago, Ill.
Filed Apr. 30, 1975, Ser. No. 573,263
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—158

246,029
PACKAGING CONTAINER OR THE LIKE
Elmer C. Lynn, Des Moines, Iowa, and Leonard Slaughter, Jr., Kansas City, Mo., assignors to Robb Container Corporation, Yorkville, Ill.
Filed Jan. 8, 1976, Ser. No. 647,354
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—216

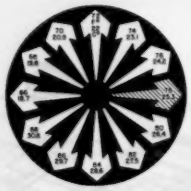


246,030
CAN OR SIMILAR ARTICLE
Edward W. Sexton, 20 Coolidge Ave., Cambridge, Mass. 02139, and Edward W. Sexton, Jr., 990 Massachusetts Ave., Arlington, Mass. 02149
Filed Nov. 12, 1975, Ser. No. 631,069
The portion of the term of this patent subsequent to Oct. 4, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—218

246,031
HEAT STRESS MONITOR
John C. Kroon, Chagrin Falls, and Frederick L. Glesius, Shaker Heights, both of Ohio, assignors to Reuter-Stokes, Inc.
Filed Nov. 17, 1975, Ser. No. 632,284
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—56

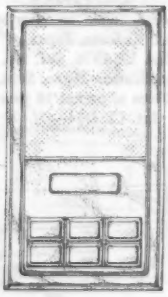


246,032
DIGITAL THERMOMETER
Allan L. McLeod, P.O. Box 18484, Wichita, Kans. 67218
Filed Oct. 14, 1975, Ser. No. 622,110
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—57

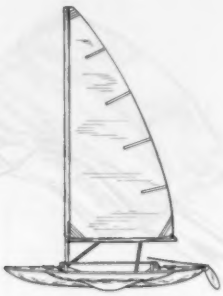


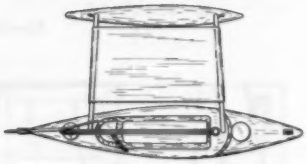
246,033
TEACHING PROTRACTOR
Dale E. King, 8799 La Zana, Fountain Valley, Calif. 92708
Filed Nov. 24, 1975, Ser. No. 634,627
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—65

246,034
ORIGINAL AND ORNAMENTAL SECURITY CONSOLE
Walton E. Sparks, Pittsburgh, Pa., and Richard K. Weiss, Pittsford, N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Continuation-in-part of Ser. No. 572,810, April 29, 1975, abandoned. This application May 27, 1976, Ser. No. 690,441
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106



246,035
SAILBOAT
Rudolf Rudiger, 800 Andersen Drive, San Rafael, Calif. 94901
Filed Sept. 16, 1976, Ser. No. 723,741
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—64





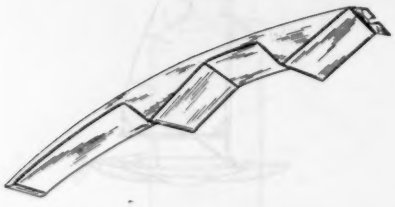
246,036
FOLDING WALKER
Morton I. Thomas, 101 Gedney St., Nyack, N.Y. 10960
Filed Sept. 15, 1975, Ser. No. 613,700
Term of patent 14 years
Int. Cl. D12—*12*
U.S. Cl. D12—130

246,037

OVERHEAD CONSOLE FOR AUTOMOBILES AND TRUCKS

Jerry Robert Kelly, Apt. 206, 1717 N. Verdugo Road, Glendale, Calif. 91206

Filed Dec. 9, 1976, Ser. No. 748,958
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155



246,038

COMBINED MUFFLER AND SPARK ARRESTOR

Paul S. Moller, Dixon, Calif., assignor to Discojet Corporation, Davis, Calif.

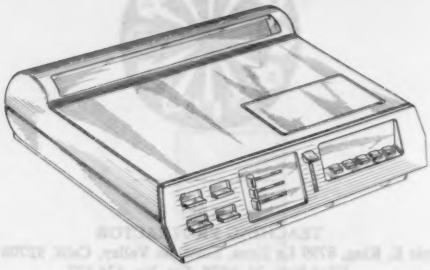
Filed Jan. 16, 1976, Ser. No. 649,781
Term of patent 14 years
Int. Cl. D15—*01*
U.S. Cl. D12—194

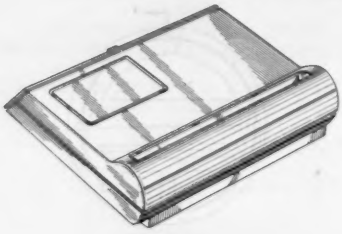
246,039

DICTATION MACHINE OR SIMILAR ARTICLE

Arthur J. Pulos, Fayetteville; Michael Cridland, Manlius, and Joseph Moro, Ithaca, all of N.Y., assignors to Dictaphone Corporation, Rye, N.Y.

Filed Oct. 21, 1975, Ser. No. 624,459
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—3



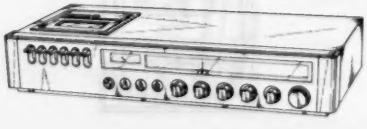


246,040

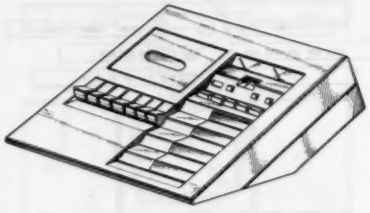
COMBINED TAPE RECORDER, TUNER AND AMPLIFIER

Kunio Hoshino, Kadoma, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Mar. 17, 1976, Ser. No. 667,801
Claims priority, application Japan, Sept. 19, 1975, 50-38372
Term of patent 14 years
Int. Cl. D14—*01, 03*
U.S. Cl. D14—5

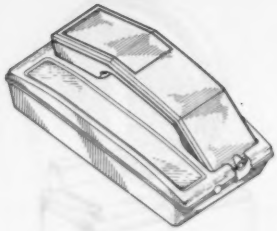


246,041
CASSETTE-DECK
Mario Bellini, Lugano, Switzerland, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan
Filed Oct. 15, 1975, Ser. No. 622,468
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—6

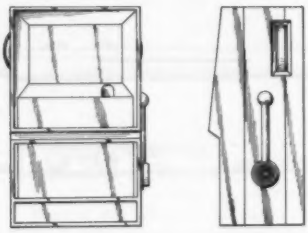


246,042
AUTOMATIC TELEPHONE DIALER
Gregory F. Fossella, Marshfield, and Peter K. Rhoads, Stow, both of Mass., assignors to DASA Corporation, Andover, Mass.
Filed Sept. 2, 1975, Ser. No. 609,661
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53

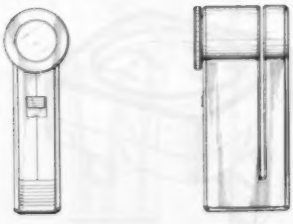
246,043
VEHICULAR TELEPHONE APPARATUS OR SIMILAR ARTICLE
Terrance Nelson Taylor, Cary, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Filed Aug. 12, 1976, Ser. No. 713,760
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53



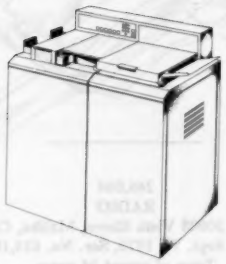
246,044
RADIO
Roland J. Susich, 30608 Vista Sierra, Malibu, Calif. 90265
Filed Sept. 17, 1975, Ser. No. 614,182
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—69



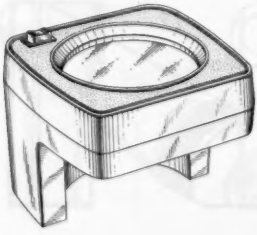
246,045
VIEWING GLASS FOR MICROFILM
Sakuta Suzuki, Tokyo, Japan, assignor to UNIC Corporation, Tokyo, Japan
Filed May 14, 1976, Ser. No. 686,665
Term of patent 7 years
Int. Cl. D16—*02*; D26—*02*
U.S. Cl. D16—11



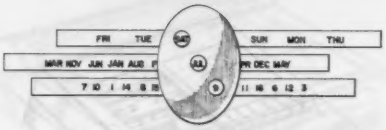
246,046
ELECTROPHOTOGRAPHIC APPARATUS OR SIMILAR ARTICLE
Allen Dana Hawthorne, New Canaan, Conn., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Mar. 4, 1976, Ser. No. 663,644
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—30



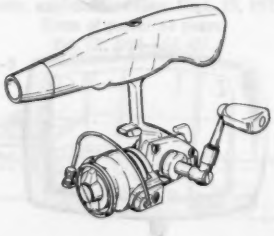
246,047
ILLUMINATED TABLE MAGNIFIER
Alexander Zalman, 5202 Areca Palm Circle, Tamarac, Fla. 33319
Filed Oct. 24, 1975, Ser. No. 625,714
Term of patent 14 years
Int. Cl. D16—*06;* D26—*05*
U.S. Cl. D16—55



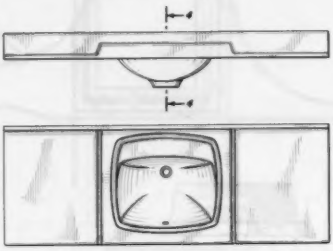
246,048
WALL CALENDAR
Lee J. Damman, Rte. 1, Mount Horeb, Wis. 53572
Filed Sept. 18, 1975, Ser. No. 614,489
Term of patent 14 years
Int. Cl. D19—*03*
U.S. Cl. D19—25



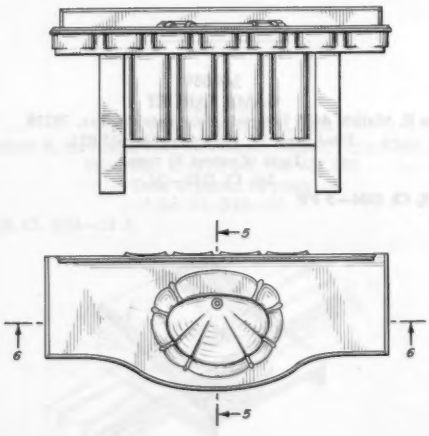
246,049
COMBINED FISHING REEL AND FISHING ROD GRIP
Hideo Nakamura, Koganei, Japan, assignor to Daiwa Seiko, Inc., Higashi-Kurume, Japan
Filed Dec. 8, 1976, Ser. No. 748,442
Claims priority, application Japan, July 16, 1976, 5127550
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—26



246,050
VANITY BOWL
Louis A. Garasi, Canyon Country, Calif., assignor to Pinta's Cultured Marble Inc., Worth, Ill.
Filed Nov. 11, 1976, Ser. No. 741,138
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58

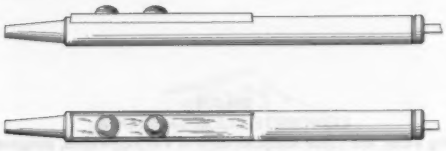


246,051
COMBINED VANITY BOWL AND STAND
George S. Gruber, Hidden Hills, Calif., assignor to Dimensionetix, Inc., North Hollywood, Calif.
Filed Dec. 8, 1976, Ser. No. 748,658
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—59

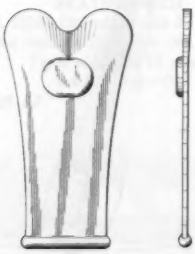


246,052
FUMIGATOR
Yoshiaki Hatai, Kawaguchi, Japan, assignor to Taisho Pharmaceutical Co., Ltd., Tokyo, Japan
Filed June 30, 1976, Ser. No. 701,021
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150

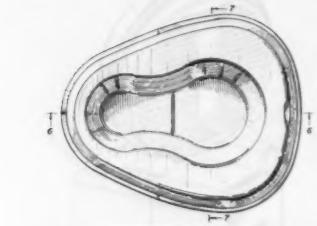
246,053
MONOPOLAR ELECTROSURGICAL DEVICE WITH HAND SWITCH
David E. Staub, Clearwater, and Vernon H. Troutner, South St. Petersburg, both of Fla., assignors to Concept, Inc.
Filed Feb. 23, 1976, Ser. No. 660,451
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—26

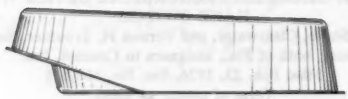


246,054
APPLIANCE FOR EXERCIZING THE TEETH AND GUMS
Albert E. Bissonnette, 3782 S. Quebec, Denver, Colo. 80237
Filed Oct. 20, 1975, Ser. No. 623,828
Term of patent 14 years
Int. Cl. D24—*99*; D28—*03*
U.S. Cl. D24—36



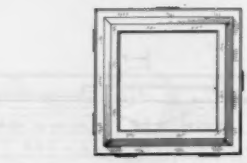
246,055
SELF SUPPORTING DISPOSABLE BED PAN
Kenneth Wilson Mills, 11 Redcar Road, Smithills Dean, Bolton, Lancashire, England
Filed Oct. 8, 1975, Ser. No. 620,584
Claims priority, application United Kingdom, May 27, 1975, 971240/75
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—57



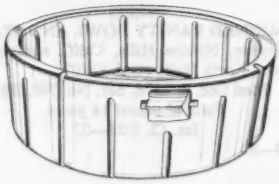


246,056
CONCRETE SLEEPER BLOCK
Stig Thim, and Claes Ahlquist, both of Vaxjo, Sweden, assignors to A-Betong AB, Vaxjo, Sweden
Filed July 30, 1976, Ser. No. 710,047
Claims priority, application Sweden, Feb. 13, 1976, 76-0340
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—73

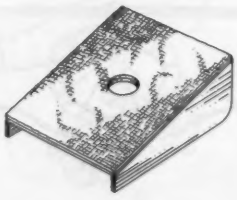
246,057
TRANSLUCENT INTER-LOCKING PANEL MEMBER FOR CEILINGS OR THE LIKE
Edward J. Maresca, Fort Lauderdale, Fla., assignor to Cal-Mar Industries, Inc., Hollywood, Fla.
Filed Sept. 8, 1975, Ser. No. 611,086
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—91



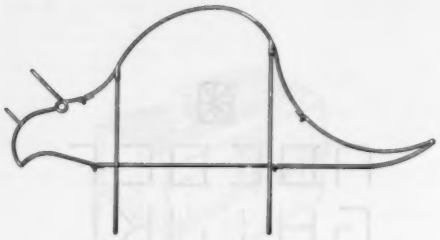
246,058
POOL
Kenneth Peter Burgess, Kew Surrey, and Timothy Sefton Elsdale, London, both of England, assignors to WCB Containers Limited, Stalybridge, England
Filed Aug. 19, 1975, Ser. No. 605,897
Claims priority, application United Kingdom, Feb. 19, 1975, 969945/75
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 F



246,059
GAME TARGET
Jim E. Malish, 4435 Longvale, San Antonio, Tex. 78218
Filed Sept. 22, 1975, Ser. No. 615,811
Term of patent 3½ years
Int. Cl. D21—*01*
U.S. Cl. D34—5 PP

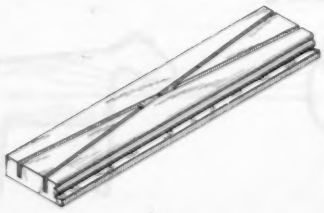


246,060
PLAYGROUND CLIMBER OR SIMILAR ARTICLES
William Cook Murphy, Miami, Fla., assignor to William Cook Murphy, Miami, Fla.
Filed Oct. 29, 1975, Ser. No. 626,880
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 H

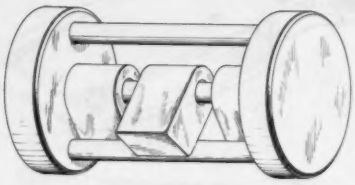


246,061
RACKET FRAME
John E. Bianchi, 1601 Wilt Road, Fallbrook, Calif. 92028
Filed Nov. 21, 1975, Ser. No. 634,125
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 ST

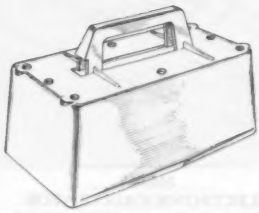
246,062
PLAYING CARD HOLDER
Robert R. Kowalski, 1161 N. Lincoln, Casper, Wyo. 82601
Filed Dec. 8, 1975, Ser. No. 638,752
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—13 A



246,063
AUDIBLE TOY
Kerstin Margaretha Hagland-Ahrnborg, Falun, Sweden, assignor to Brio Toy AB
Filed Jan. 5, 1976, Ser. No. 646,672
Claims priority, application Germany, July 8, 1975, URA447/75
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 C

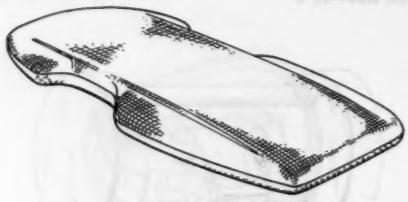


246,064
TOY BUILDING BLOCK MOLD
Jeffrey M. Koblick, Hopkins, Minn., assignor to K-tel International, Inc.
Filed Sept. 29, 1975, Ser. No. 617,387
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 V

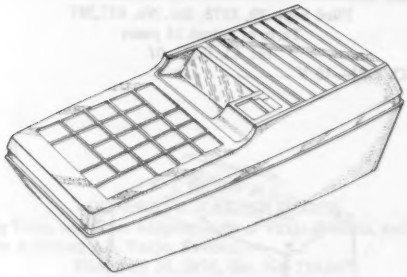


246,065
SKATE BOARD
Edward L. Saul, 10350 Harvest, Santa Fe Springs, Calif. 90670
Filed Jan. 19, 1976, Ser. No. 650,548
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

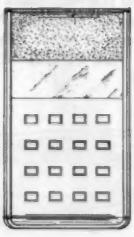
246,066
KICK BOARD
Kevin J. O'Farrell, San Francisco, Calif., assignor to Kranso Manufacturing, Inc., San Francisco, Calif.
Filed Aug. 20, 1976, Ser. No. 716,123
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—42



246,067
CALCULATOR CASING
Eugene Joseph Sulek, Plano, Tex., assignor to Texas Instruments Incorporated
Filed Apr. 28, 1975, Ser. No. 572,244
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B



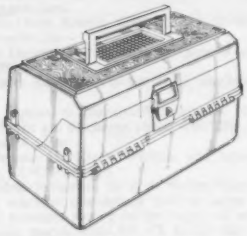
246,068
ELECTRONIC CALCULATOR
Lawrence Glen McCain, Beverly Hills, and Edward William Scott, Culver City, both of Calif., assignors to Rockwell International Corporation
Division of Ser. No. 487,061, July 10, 1974, Pat. No. Des. 240,737.
This application Apr. 2, 1976, Ser. No. 673,227
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B



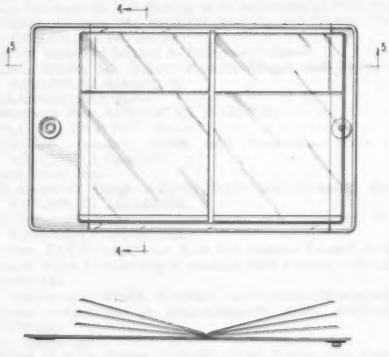
246,069
FONT OF CHARACTERS
Denis E. Bedel, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Mar. 25, 1976, Ser. No. 670,581
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D64—12 B

246,070
PROTECTIVE COVER FOR AN ANIMAL CARCASS
Carroll Stanley Machos, 602 Hidden Valley, Houston, Tex. 77037
Filed Oct. 20, 1975, Ser. No. 623,571
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R

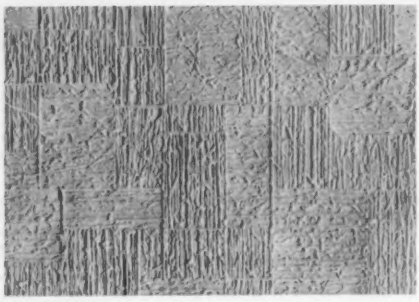
246,071
TACKLE BOX
Harper Landell, Fort Washington, and Anthony J. Souza, Lancaster, both of Pa., assignors to Woodstream Corporation, Lititz, Pa.
Filed Feb. 3, 1976, Ser. No. 654,776
Term of patent 14 years
Int. Cl. D22—*05;* D3—*02*
U.S. Cl. D87—1 R



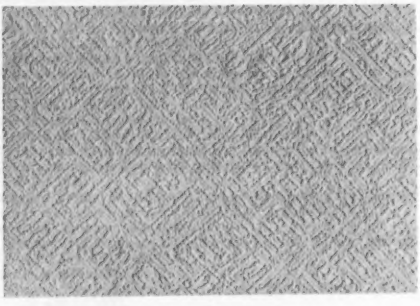
246,072
COMBINED MEDICATION AND INSTRUCTION CARD CARRIER CASE
Frank W. Jackson, Mechanicsburg, Pa., assignor to American Sterilizer Company, Erie, Pa.
Filed June 3, 1975, Ser. No. 583,433
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 A



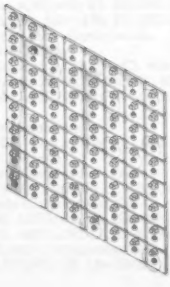
246,073
EMBOSSED PLASTIC SHEET MATERIAL
Jared R. Kies, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed Mar. 12, 1976, Ser. No. 666,513
Term of patent 14 years
Int. Cl. D5—*06*
U.S. Cl. D87—3 G



246,074
EMBOSSED PLASTIC SHEET MATERIAL
Jared R. Kies, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed Mar. 12, 1976, Ser. No. 666,514
Term of patent 14 years
Int. Cl. D5—*06*
U.S. Cl. D87—3 G



246,075
DISPLAY DEVICE FOR USE WITH COLORED FLICKER PLATES
Taketoshi Kato, 14-11 Ginza 1-chome, Chuo, Tokyo, Japan
Filed June 22, 1976, Ser. No. 698,603
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF OCTOBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A G L Corporation: *See*—
George, Lyndell J. C.; and Shelly, Robert S., 4,053,238, Cl. 356-249.000.

AB Kalle-Regulator, Industrivagen: *See*—
Kitsnik, Henrik Martin, 4,053,354, Cl. 162-198.000.

AB Ostgota-Byggen: *See*—
Larsson, Nils Osten Arnold, 4,052,825, Cl. 52-98.000.

Abbott Laboratories: *See*—
Smith, Irvin Darrow; and Seymour, Eugene Wesley, 4,053,592, Cl. 424-181.000.

Abernethy, Robert Ray. Fluorescent lamp simulator. 4,053,811, Cl. 315-95.000.

Aboelfotoh, M. Osama, to International Business Machines Corporation. Dielectric for gas discharge panel. 4,053,804, Cl. 313-218.000.

Aboutboul, Henri A.: *See*—
Krekeler, Jerome H.; Kirch, William; and Aboutboul, Henri A., 4,053,565, Cl. 423-338.000.

Abrahams, Jacobus Hubertus, to U.S. Philips Corporation. Hot-gas reciprocating machine comprising two or more working spaces, provided with a control device for the supply of working medium to the said working spaces. 4,052,853, Cl. 60-521.000.

ACF Industries, Inc.: *See*—
Niebrzydoski, John L., 4,053,542, Cl. 261-23.00A.
Pettitt, James H., 4,053,543, Cl. 261-121.00B.

Acker, William F., to Honeywell Inc. Amplifier apparatus. 4,053,846, Cl. 330-279.000.

Acres, Gary James Keith, to Johnson, Matthey & Co., Limited. Catalysis. 4,053,556, Cl. 423-239.000.

Adamian, Michael R. Ignition arc monitor circuit. 4,053,823, Cl. 324-17.000.

Adams, John Benjamin, Jr.; Ellis, Richard Lee; and Lin, Kang, to Du Pont de Nemours, E. I., and Company. Novel thiotriazinediones and their use as herbicides. 4,053,299, Cl. 71-93.000.

Adams, Sally Lee; Cook, Michael M.; and Martin, Fred David, to Calgon Corporation. Method of using cementing composition having improved flow properties. 4,053,323, Cl. 106-100.000.

Adams, Stewart Sanders; Armitage, Bernard John; Nicholson, John Stuart; and Blancafort, Antonio Ribera, to Boots Company Limited, The. Therapeutically active phenylalkane derivatives. 4,053,639, Cl. 424-343.000.

Adaptronics, Inc.: *See*—
Mucciardi, Anthony N.; and Shankar, Ramesh, 4,052,889, Cl. 73-67.80S.

Adolf A. Fleischmann, Firma: *See*—
Fleischmann, Werner; Reinkenobbe, Heinz-Otto; and Schmidt, Manfred, 4,053,278, Cl. 432-137.000.

Advani, Jeram G.; Paganini, Bruno J.; and Hale, William J., to NCR Corporation. Automatic speaker verification systems employing moment invariants. 4,053,710, Cl. 179-1.0SB.

Aerodyne Research, Inc.: *See*—
Bien, Fritz; Camac, Morton; and Gersh, Michael Elliot, 4,053,233, Cl. 356-141.000.

Aerosol Inventions & Development S.A. Aid SA: *See*—
DeBard, Andre, 4,053,086, Cl. 222-182.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Vidalin, Jacques M.; Suchard, Jean F.; and Quang, Hong H., 4,053,871, Cl. 340-146.200.

Agency of Industrial Science & Technology: *See*—
Kato, Shuzo; Iga, Takeo; Hatano, Shogo; and Isawa, Yuichi, 4,053,579, Cl. 423-630.000.

AGFA-Gevaert AG: *See*—
Feneberg, Paul, 4,052,916, Cl. 76-107.00R.

AGFA-GEVAERT, N.V.: *See*—
Borginon, Hendrik Alfons; and Vanassche, Willy Joseph, 4,053,315, Cl. 96-63.000.

Ahlgren, Sture: *See*—
Skafvenstedt, Bengt; Ahlgren, Sture; and Tschuertz, Eberhard, 4,053,901, Cl. 346-140.00R.
Skafvenstedt, Bengt; Ahlgren, Sture; and Tschuertz, Eberhard, 4,053,902, Cl. 346-140.00R.

Ahrweiler, Karl-Heinz; Quoos, Kurt; and Kusters, Eduard, to Kusters, Eduard. Press for exerting a pressure over an area. 4,053,276, Cl. 425-406.000.

Aidn, Martin; and Wanka, Eberhard, to Siemens Aktiengesellschaft. Magnet system for an electromagnetic relay. 4,053,858, Cl. 335-276.000.

Aihara, Sukeji: *See*—
Fujita, Yoshiji; Omura, Yoshiaki; Mori, Fumio; Itoi, Kazuo; Nishida, Takashi; Tamai, Yoshin; Aihara, Sukeji; Hosogai, Takeo; and Wada, Fumio, 4,053,380, Cl. 204-163.00R.

Aikins, Warren A., to Swing-Shift Mfg. Co. Reversible reel unit. 4,053,118, Cl. 242-107.110.

Ainoya, Koh; and Koyama, Nobuyuki, to Japan Tobacco and Salt Public Corporation, The. System for cyclic operation of self-running objects. 4,053,741, Cl. 364-478.000.

Air Filters, Inc.: *See*—
Howard, Laurence M.; and Schaaf, Robert, 4,053,416, Cl. 210-227.000.

Air Monitor Corporation: *See*—
DeBaun, Kenneth W., 4,052,897, Cl. 73-212.000.

Air Quality Products, Inc.: *See*—
Gockel, Jack L., 4,052,966, Cl. 123-117.00A.

Aisin Seiki Kabushiki Kaisha: *See*—
Yamazaki, Takeo; and Harada, Kuniyoshi, 4,052,768, Cl. 16-121.000.

Aizawa, Hiroshi; Hosoe, Kazuya; Matsumoto, Seiichi; and Yokota, Hideo, to Canon Kabushiki Kaisha. Object distance measuring system for an optical instrument. 4,053,240, Cl. 356-4.000.

Akzo N.V.: *See*—
Zengel, Hans; and Bergfeld, Manfred, 4,053,510, Cl. 260-557.00R.

Akzona Incorporated: *See*—
Bos, Cornelis; and Daamen, Jacobus J. H. G., 4,053,277, Cl. 432-60.000.
Posch, Nancy Ann, 4,053,284, Cl. 23-259.000.
Wagener, Kenneth Boone; Spivey, Bron Walter, Jr.; and Chapman, James Mood, Jr., 4,053,441, Cl. 260-18.00N.

Albatex A.G.: *See*—
Genini, Graziano, 4,052,906, Cl. 74-57.000.

Albright, Alva Z. Method of harvesting trees. 4,053,005, Cl. 144-309.0AC.

Albright & Wilson Limited: *See*—
Crowther, John C., 4,053,374, Cl. 204-51.000.

Allen-Bradley Company: *See*—
Ray, Glen; and Leniewski, Leonard W., 4,053,801, Cl. 310-216.000.

Allied Chemical Corporation: *See*—
Franz, Gerhard, 4,053,567, Cl. 423-386.000.
Harrer, T. S., deceased; Karsay, B. I.; and Sturtevant, R. L., 4,053,573, Cl. 423-540.000.
Schulze, Stephen R., 4,053,445, Cl. 260-31.20R.

Allison, Anthony Clifford; and Gregoriadis, Gregory, to National Research Development Corporation. Immunological preparations. 4,053,585, Cl. 424-92.000.

Alpha Systems Corporation: *See*—
Switzgable, Harold, 4,053,395, Cl. 210-12.000.

Alterman, Israel, to Environmental Engineering Dr. Ing. Alterman Ltd. Construction of underground tunnels and rock chambers. 4,052,860, Cl. 61-45.00B.

Altschuler, Sidney J., to Dow Chemical Company, The. Geothermal energy from salt formations. 4,052,857, Cl. 60-641.000.

Aluminum Company of America: *See*—
Cochran, C. Norman; Das, Subodh K.; and Milito, Richard A., 4,053,303, Cl. 75-68.00A.

Alza Corporation: *See*—
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Amana Refrigeration, Inc.: *See*—
Foerstner, Richard A., 4,053,731, Cl. 219-10.55D.

Amaya, Yuji, to Fujitsu Ten Limited. Radio receiver. 4,053,838, Cl. 325-470.000.

Amberg, Stephen W.; and Doherty, Thomas E., to Owens-Illinois, Inc. Method and apparatus for forming thermoplastic containers. 4,053,346, Cl. 156-446.000.

Ambler, Frank E.; Duthler, Carl James; and Moise, Norton L., to Xonics, Inc. Metal detector with first and second nested rectangular coils. 4,053,828, Cl. 324-41.000.

American Cyanamid Company: *See*—
Asato, Goro, 4,053,484, Cl. 260-332.30P.
Gordon, John Edson, 4,053,490, Cl. 260-397.70R.
Mohan, Arthur Gaudens, 4,053,430, Cl. 252-188.3CL.
Panzer, Hans Peter; and Bardoliwalla, Dinshaw Framroze, 4,053,512, Cl. 260-567.60P.
Schrider, Michael Stanley, 4,053,631, Cl. 424-304.000.
Walworth, Bryant Leonidas, 4,053,610, Cl. 424-273.00P.
Weston, Norma Ann; and Hillard, Ray Leonard, 4,053,518, Cl. 260-606.50P.

American Hoechst Corporation: *See*—
Effland, Richard C.; Davis, Larry; and Schaub, Wolfgang, 4,053,599, Cl. 424-250.000.

American Home Products Corporation: *See*—
Kao, Wenling; and Strike, Donald P., 4,053,467, Cl. 260-240.00R.

American Hospital Supply Corporation: *See*—
Jasper, Mark Friedel, 4,053,052, Cl. 206-439.000.
Salisbury, Thomas E., 4,053,280, Cl. 21-87.000.

American Sign and Indicator Corporation: *See*—
Work, Gerald L., 4,053,340, Cl. 156-70.000.

Ametek, Inc.: *See—*
Schmidt, Ferenc J., 4,053,386, Cl. 204-264.000.

AMF Incorporated: *See—*
Day, John Herbert, 4,053,056, Cl. 209-73.000.

AMP Incorporated: *See—*
Davis, Thomas Francis, 4,053,372, Cl. 204-43.00S.
Foust, Tilman H., Jr., 4,053,936, Cl. 360-62.000.
Hollyday, Robert David; and Hudson, William Jeffrey, Jr., 4,053,199, Cl. 339-147.00R.
Teagno, Vladimiro, 4,053,197, Cl. 339-99.00R.

Ampex Corporation: *See—*
Lemoine, Maurice G.; and Pasdera, Leonard A., 4,053,926, Cl. 358-8.000.

Amsco/Medical Electronics, Inc.: *See—*
Hudspeth, Emmett L.; Richardson, Philip C.; Neathery, John L., Jr.; Dykstra, Jerald P.; Boger, Allen D., Jr.; Sims, William B., Jr.; Hunt, Glenn E.; and Quisenberry, Tony M., 4,053,951, Cl. 364-415.000.

Anderson, Bruce W., to Illinois Tool Works Inc. Filler plug. 4,053,084, Cl. 220-229.000.

Anderson Company, The: *See—*
McKissack, Patrick G., 4,052,919, Cl. 83-205.000.

Anderson, Robert, to General Signal Corporation. Fail safe digital code rate generator. 4,053,879, Cl. 340-351.000.

Andersons, The: *See—*
Vander Hooven, David I. B.; Van der Zwan, Jacobus Johan; Logston, James L.; and Pennington, Carl E., 4,053,112, Cl. 241-24.000.

Ando, Ken; Kamosaki, Minoru; Ohya, Yoshinobu; and Asai, Sigeru, to Daicel, Ltd. Hot stamp transfer press plate. 4,053,672, Cl. 428-207.000.

Ando, Masahisa; Katow, Keigo; and Yamazaki, Masami, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas recirculation valve device for an internal combustion engine. 4,052,969, Cl. 123-119.00A.

Andreaggi, Joseph R., to Weston Instruments, Inc. Combination display cover, handle, and tilt stand for portable instrument. 4,053,047, Cl. 206-45.200.

Andrews, Austin M., II; Clarke, John E.; Longo, Joseph T.; and Gertner, Edward R., to United States of America, Air Force. High speed infrared detector. 4,053,919, Cl. 357-30.000.

Anesi, Mario, to Ansan Tool and Manufacturing Co., Inc. Lawn edge trimmer. 4,052,791, Cl. 30-315.000.

Angevine, Peter Allen: *See—*
Roberts, Elliott J.; Bunk, Stanley; and Angevine, Peter Allen, 4,053,375, Cl. 204-67.000.

Ansan Tool and Manufacturing Co., Inc.: *See—*
Anesi, Mario, 4,052,791, Cl. 30-315.000.

Aozuka, Torao; Ohkoshi, Akio; Muramoto, Shoichi; Nakayama, Akira; and Sumi, Koichiro, to Sony Corporation. Thermionic cathode and heater structure on ceramic base plate. 4,053,807, Cl. 313-409.000.

Apel, Gerhard: *See—*
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Apollo of the Ozarks, Inc.: *See—*
Gits, Gerald B.; and Deverich, Daniel L., 4,052,940, Cl. 102-33.000.

Apple, Martin A.; and Formica, Joseph V., to University of California, The Regents of the. Azetomycins. 4,053,460, Cl. 260-112.50R.

Appleby, Paul E.; Christie, Christopher E.; Gerstenmaier, John H.; Minter, Thomas F.; and Woodhall, Edwin S., to Goodyear Tire & Rubber Company, The. Tire building system. 4,053,342, Cl. 156-123.00R.

Aquology Pet Corporation: *See—*
Horvath, Tibor, 4,053,262, Cl. 417-424.000.

Arbrook, Inc.: *See—*
Fox, John Francis; Roylance, Thomas William; and Mair, Angus Campbell, 4,053,379, Cl. 204-160.100.

Arena, Frank. Human waste disposal system. 4,052,758, Cl. 4-79.000.

Arendt, Hans F. Process and apparatus for the continuous finishing of webs of textiles, artificial leather and the like. 4,052,796, Cl. 34-60.000.

Argurio, Federico; Borsatti, Mario; and Heindrijckx, Jan, to Exxon Research & Engineering Co. Self-sealing films. 4,053,540, Cl. 260-897.00B.

Arkless, Kenneth, to Tioxide Group Limited. Process for the gaseous phase production of metal oxide particles. 4,053,577, Cl. 423-592.000.

Armitage, Bernard John: *See—*
Adams, Stewart Sanders; Armitage, Bernard John; Nicholson, John Stuart; and Blancafort, Antonio Ribera, 4,053,639, Cl. 424-343.000.

Armour and Company: *See—*
Kammiah, Henry W.; Herring, Harold K.; and Koch, Duane E., 4,052,890, Cl. 73-81.000.
Svacik, Joseph T., 4,053,649, Cl. 426-266.000.

Armstrong Cork Company: *See—*
Barbson, Grafton K., 4,053,762, Cl. 362-223.000.
Chlystek, Stanley J., 4,053,439, Cl. 260-2.5AJ.
Dieck, Ronald L.; and Quinn, Edwin J., 4,053,456, Cl. 260-47.00P.
Herweh, John E.; and Whitmore, William Y., 4,053,538, Cl. 260-860.000.

Arndt, Douglas Arthur: *See—*
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Arnold, Robert J.; and Gattuso, Marion J., to UOP Inc. Vulcanizable rubber formulations with bis(sulfonamido)sulfide. 4,053,458, Cl. 260-79.50A.

Arola, Rodger A.: *See—*
Barwise, Robert D.; Arola, Rodger A.; and Erickson, John R., 4,053,004, Cl. 144-162.00R.

Arras, Juho; Mattsson, Mats Orjan; and Widl, Walter Herbert Erwin, to Telefonaktiebolaget L M Ericsson. Method and apparatus for measuring the bit error frequency in a cable caused by crosstalk between line pairs during transmission of a 3-level coded PCM signal. 4,053,723, Cl. 179-175.30R.

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Artec, Incorporated: *See—*
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Asada, Hiroshi: *See—*
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Asada, Mamoru; Shiga, Akinobu; and Matsuyama, Kiyoshi, to Sumitomo Chemical Company, Limited. Process for producing propylene homopolymers and copolymers. 4,053,697, Cl. 526-142.000.

Asahi Breweries, Ltd.: *See—*
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Asahi Glass Company Ltd.: *See—*
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Asato, Goro, to American Cyanamid Company. 1-Benzoyl-3-(4,5,6,7-tetrahydrobenzo [b]thien-4-yl)ureas and 1-benzoyl-3-(4,5,6,7-tetrahydro-7-oxobenzo [b]thien-4-yl)ureas, novel intermediates for the preparation of animal growth promoting agents. 4,053,484, Cl. 260-332.30P.

ASEA Aktiebolag: *See—*
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Ashkenazi, Ellis: *See—*
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Ashton, Wallace T.: *See—*
Graham, Donald W.; Rogers, Edward F.; and Ashton, Wallace T., 4,053,602, Cl. 424-251.000.

Asquith, Dixon Redfern, to Continental Group, Inc., The. Method and apparatus for severing thin-walled tubing on a mandrel. 4,052,770, Cl. 17-42.000.

Astra Lakemedal Aktiebolag: *See—*
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Astra Lakemedel Aktiebolag: *See—*
Carnmalm, Bernt Sigfrid Emanuel; De Paulis, Tomas; Ross, Svante Bertil; Ramsby, Sten Ingvar; Stjernstrom, Nils-Erik; and Ogren, Sven-Ove, 4,053,632, Cl. 424-316.000.

Astra Pharmaceutical Products, Inc.: *See—*
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Atlantic Research Institute Limited: *See—*
Reininger, Wolfgang; and Hartl, Alfons, 4,053,517, Cl. 260-586.00D.

Atwood, John G.; Marshall, Hamilton W., Jr.; and de Mey, Charles F., II, to Perkin-Elmer Corporation, The. Absorbance measuring photometer. 4,053,236, Cl. 356-189.000.

Aude, Georges; and Laverlochere, Jean, to Commissariat a l'Energie Atomique. Method and device for activation analysis. 4,053,771, Cl. 250-328.000.

Audeh, Costandi A.: *See—*
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Audio Pulse, Inc.: *See—*
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Ault, Cyrus Frank, to Bell Telephone Laboratories, Incorporated. Adaptable exerciser for a memory system. 4,053,751, Cl. 235-302.300.

Avtron Manufacturing, Inc.: *See—*
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Axial International Establishment: *See—*
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B. F. Goodrich Company, The: *See—*
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Kroenke, William Joseph, 4,053,452, Cl. 260-45.75M.
Kroenke, William Joseph, 4,053,454, Cl. 260-45.75N.
Kroenke, William Joseph, 4,053,455, Cl. 260-45.75R.
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Baatrup, Johannes Vagn; and Christensen, Thorkild, to Danfoss A/S. Hydraulic control means, especially a steering means. 4,052,929, Cl. 91-29.000.

Bachhofer, Bruno; Locher, Anton; Skirde, Gerhard; and Quistorff, Hansjorg. Method of treating and degerminating bath water, particularly bath water contaminated by the germ bact. pseudomonas pyocanea, in medical tub-baths and underwater massage baths. 4,053,403, Cl. 210-62.000.

Bachmann, Robert J. Massaging method and apparatus. 4,052,981, Cl. 128-36.000.

Back, Gerhard: *See—*
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Backlund, John R., to National Union Electric Corporation. Thermal cells. 4,053,690, Cl. 429-112.000.

Badger Meter, Inc.: *See—*
Lee, Bock W.; Vander Heyden, William H.; and Bell, Stephen S., 4,052,896, Cl. 73-194.00A.

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Bai, Henry S. Ball for target dart game. 4,053,156, Cl. 273-106.00R.

Bailey, Angus B., to Moore-McCormack Energy, Inc. Process for preparing aromatics from naphtha. 4,053,388, Cl. 208-89.000.

Bainard, Dean R.; and Benjamin, Martin E., to Garlock Inc. Piston seal and return spring. 4,053,030, Cl. 188-71.800.

Baker, William H. Wave-quelling float. 4,052,755, Cl. 4-172.000.

Baldwin, John J., to Merck & Co., Inc. Esterified-2(3-lower-alkylamino-propoxy)-3-cyano-pyridines and derivatives. 4,053,605, Cl. 424-263.000.

Ballas, George Charles, Sr., to Weed Eater, Inc. Rotary cutting assembly. 4,052,789, Cl. 30-276.000.

Balousek, Ronald R. Full-width film-supporting, driving, and stripping arrangement for motion picture film printing machines. 4,053,230, Cl. 355-104.000.

Ban, Vladimir Sinisa: *See—*
Olsen, Gregory Hammond; and Ban, Vladimir Sinisa, 4,053,350, Cl. 156-659.000.

Banka, Eugene F.; and Lehner, Gerald J., to Burroughs Corporation. Digital rate compensator for a card reader. 4,053,736, Cl. 235-61.11D.

Baptist, Brian Kent, to International Paper Company. Shipping carton. 4,053,098, Cl. 229-23.00R.

Baptist, Brian Kent, to International Paper Company. Shipping carton. 4,053,100, Cl. 229-43.000.

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Barbieri, Marcello, to MacMillan, Robert; Della Grotta, Nicholas; and Della Grotta, Guerino D., part interest to each. Method and apparatus for constructing models of body sections. 4,053,779, Cl. 250-445.00T.

Barbson, Grafton K., to Armstrong Cork Company. Twin-beam luminaire lens. 4,053,762, Cl. 362-223.000.

Bardoliwalla, Dinshaw Framroze: *See—*
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Barnoin, Pierre: *See—*
Duret, Maurice Louis; and Barnoin, Pierre, 4,053,126, Cl. 244-119.000.

Baron, David Alan; Nash, Donald Carl; and Hampton, James Ronald, to Litton Systems Inc. Microwave oven shaft seal. 4,053,730, Cl. 219-10.55F.

Baron, Jean-Claude, to Thomson-CSF. Band compression device. 4,053,840, Cl. 328-151.000.

Barron, Lee H., Sr. Hand fed glass beveling apparatus. 4,053,288, Cl. 51-109.00R.

Bartlett, Edward C. Web tension monitor. 4,052,891, Cl. 73-144.000.

Barwise, Robert D.; Arola, Rodger A.; and Erickson, John R., to United States of America, Agriculture. Helical head comminuting shear. 4,053,004, Cl. 144-162.00R.

BASF Aktiengesellschaft: *See—*
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Herrle, Karl; Gausepohl, Hermann; and Schwarz, Wolfgang, 4,053,696, Cl. 526-65.000.
Hoffmann, Werner; Mueller, Norbert; and Paust, Joachim, 4,053,511, Cl. 260-563.00P.
Jersak, Ulrich; and Scheuermann, Horst, 4,053,527, Cl. 260-646.000.
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Baslow, Floyd M. Support molding for fabric wall coverings. 4,053,008, Cl. 160-327.000.

Battelle Memorial Institute: *See—*
Courvoisier, Jean-Claude F.; Meylan, Jean-Luc Ch.; Gross, Daniel M.; and Fournier, Jacques Pierre D., 4,053,368, Cl. 203-10.000.

Baude, Frederic John; and Cupery, Willis Eli, to Du Pont de Nemours, E. I., and Company. Stabilized formulations of 2-alkoxyimino-N-carbamoyl-2-cyanoacetamides. 4,053,612, Cl. 424-286.000.

Baughman, Ray M.: *See—*
Nelson, Rodney L., 4,053,182, Cl. 299-19.000.

Bausch & Lomb Incorporated: *See—*
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Strange, Robert F., 4,053,899, Cl. 346-68.000.
Strange, Robert F., 4,053,900, Cl. 346-136.000.

Baxter Travenol Laboratories, Inc.: *See—*
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Newman, Ferris E., 4,053,418, Cl. 210-321.00B.

Bayer Aktiengesellschaft: *See—*
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Daum, Werner; and Frohberger, Paul-Ernst, 4,053,598, Cl. 424-248.560.
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Hammerstrom, Knut; and Spielberger, Georg, 4,053,516, Cl. 260-585.00A.
Kleiner, Frank Gerald; Radojewski, Hans; Muhlbauer, Richard; and Muller, Karl-Heinz, 4,053,341, Cl. 156-79.000.
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Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 4,053,614, Cl. 424-266.000.
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Mues, Volker; and Niggemann, Johannes, 4,053,296, Cl. 71-1.000.
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Zeck, Walter Maria; deMarshall, August Cesar; and Wybou, Andre Prosper, 4,053,595, Cl. 424-216.000.

BBC Brown Boveri & Company Limited: *See—*
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Beauvais, Albert L., to Federal-Mogul Corporation. Packaging of semicylindrical sleeve bearings. 4,053,049, Cl. 206-318.000.

Beck, Keith: *See—*
Cullinan, Robert L.; Jay, Ronald W.; Beck, Keith; and Miller, Lloyd J., 4,052,880, Cl. 72-326.000.

Becker, Reinhold: *See—*
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Beckman Instruments, Inc.: *See—*
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Beckmann, Oskar, to Siemens Aktiengesellschaft. Radio signal switching system employing dielectric rod antennas. 4,053,894, Cl. 343-225.000.

Beecham Group Limited: *See—*
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Beffa, Fabio; and Back, Gerhard, to Ciba-Geigy Corporation. Unsymmetrical phenyl azo naphthyl chromium complex dyes. 4,053,462, Cl. 260-145.00B.

Beguin, Jean-Luc; and Droz, Willy, to Ebauches S.A. Circuit for electronic watches. 4,052,842, Cl. 58-50.00R.

Beine, Karlheinz. Track assembly with anchoring device. 4,052,833, Cl. 52-710.000.

Beischel, Jerome K.; and Bursk, William M., to Pease Company. Double door astragal. 4,052,819, Cl. 49-368.000.

Belcher, Richard A.: *See—*
Kozacka, Frederick J.; and Belcher, Richard A., 4,053,860, Cl. 337-164.000.

Bell & Howell Company: *See—*
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Bell, Stephen S.: *See—*
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Hotchkiss, LaVerne Charles, 4,053,708, Cl. 178-69.100.
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Miller, Stewart Edward, 4,053,205, Cl. 350-96.0GN.
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Bellina, Russell Frank; and Fost, Dennis Lynn, to Du Pont de Nemours, E. I., and Company. Miticidal and aphicidal method utilizing 2-higher alkyl-3-hydroxy-1,4-naphthoquinone carboxylic acid esters. 4,053,634, Cl. 424-312.000.

Bembenek, William E.: *See—*
Hilton, Barney W.; and Bembenek, William E., 4,052,838, Cl. 53-159.000.

Bendix Corporation, The: *See—*
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Jakobi, Dieter, 4,053,186, Cl. 303-6.00C.
Moseman, Paul W., Jr.; and Hart, Russell F., 4,052,902, Cl. 73-387.000.
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Berdahl, C. Martin, to California Institute of Technology. X-ray exposure sensor and controller. 4,053,774, Cl. 250-355.000.

Berg, David W.: *See—*
Branham, William C.; Garlapaty, Venkat R.; and Berg, David W., 4,053,036, Cl. 192-13.00R.

Berger, Heinz Otto; and Munstedt, Wolfgang, to GEBA, Gesellschaft fuer elektronische Brandmeldeanlagen mbH & Co. Accident- and tampering-proof attachment means of an object to a stationary support. 4,053,777, Cl. 250-380.000.

Bergez, Pierre; Lacroix, Roger; Plurien, Pierre; and Touboul, Jean-Paul, to Commissariat a l'Energie Atomique. Method of processing porous metal filters. 4,053,662, Cl. 427-250.000.

Bergfeld, Manfred: *See*—
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Bergh, John C., to Wheelabrator-Frye, Inc. Portable surface treating apparatus. 4,052,820, Cl. 51-423.000.

Bergman, Rolf S.: *See*—
Fridrich, Elmer G.; and Bergman, Rolf S., 4,053,809, Cl. 313-198.000.

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Berkey Photo, Inc.: *See*—
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Berlin, Robert D.; and Williams, Jack B., to United States of America, Air Force. Recursive processing of multiple intensity-modulated scans. 4,053,754, Cl. 364-723.000.

Besenfelder, Edward Roald; and Cantrell, Steve Garner, to Honeywell Information Systems Inc. Programmable data envelope detector. 4,053,738, Cl. 235-92.0PB.

Best Line Warehouse, Inc.: *See*—
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Best Lock Corporation: *See*—
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Best, Walter E.; and McCullum, R. Gene, to Best Lock Corporation. Door knob construction. 4,052,868, Cl. 70-224.000.

Bethlehem Steel Corporation: *See*—
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Betz, Helmut; Hidasi, Geza; and Orde, Hans-Otto Vom, to Hoechst Aktiengesellschaft. Fiber tow for stuffing purposes and process for producing it. 4,053,678, Cl. 428-369.000.

Bianchi, Emilio, to Axial International Establishment. Axial fan adjustable pitch connectable blades. 4,053,259, Cl. 416-208.000.

Biederman, William. Orthodontic device. 4,052,792, Cl. 32-14.00A.

Bien, Fritz; Camac, Morton; and Gersh, Michael Elliot, to Aerodyne Research, Inc. Retroreflectors. 4,053,233, Cl. 356-141.000.

Birkbeck, Alexander E.; and Walden, Cecil Craig, to Province of British Columbia. Fish rearing system. 4,052,960, Cl. 119-3.000.

Birkett, Gordon M.: *See*—
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Birkner, Udo, to Blaupunkt-Werke GmbH. Attachment arrangement for electronic apparatus to a support wall. 4,053,130, Cl. 248-27.300.

Bitter, Charles Raymond, Jr.; and Malcolm, Robert Bruce, to Motorola, Inc. Self-erecting, hemispherically directional buoy antenna. 4,053,896, Cl. 343-709.000.

Bjerk, Roger O., to Caterpillar Tractor Co. Dynamic air bearing seal - radially and axially stabilized. 4,053,162, Cl. 277-75.000.

Bjork, Albion P. Level detecting. 4,052,901, Cl. 73-313.000.

Blackburn, Keith: *See*—
Ross, Douglas; and Blackburn, Keith, 4,053,072, Cl. 214-512.000.

Blackwell, Jennings P., to Phillips Petroleum Company. Poly(arylene sulfide) coated glazed surfaces. 4,053,675, Cl. 428-426.

Blaha, Franklyn C.; Cricchi, James R.; and White, Marvin H., to United States of America, Air Force. Drain source protected MNOS transistor and method of manufacture. 4,053,917, Cl. 357-23.000.

Blake, Henry E., Jr.: *See*—
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Blancafort, Antonio Ribera: *See*—
Adams, Stewart Sanders; Armitage, Bernard John; Nicholson, John Stuart; and Blancafort, Antonio Ribera, 4,053,639, Cl. 424-343.000.

Blank, Heinz Ulrich; Durholz, Friedrich; and Skipka, Guido, to Bayer Aktiengesellschaft. Process for isolating dinitronaphthalenes. 4,053,526, Cl. 260-645.000.

Blanpied, Robert Howard: *See*—
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Blaupunkt-Werke GmbH: *See*—
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Bleazey, John Clifford; and Leedom, Marvin Allan, to RCA Corporation. Stylus arm lifting/lowering apparatus for a video disc player. 4,053,161, Cl. 274-23.00R.

Block Engineering, Inc.: *See*—
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Blount, Richard, to General Electric Company. Photoflash lamp array having radiation switches and flash indicators. 4,053,757, Cl. 362-4.000.

Boccon-Gibod, Raymond, to Societe de vente de l'Aluminium Pechiney. Process and apparatus for the continuous casting of metal products. 4,053,010, Cl. 164-86.000.

Bock, Edward C.: *See*—
Burkard, Charles M.; and Bock, Edward C., 4,053,224, Cl. 355-76.000.

Bodlaj, Viktor, to Siemens Aktiengesellschaft. Method and apparatus for automatic and contactless measurement of the height of moving blades of a turbine. 4,053,227, Cl. 356-4.000.

Bodnar, Jurij. Multiple exposure optical recording apparatus. 4,053,910, Cl. 354-120.000.

Boehringer Mannheim GmbH: *See*—
Hubner, Manfred; Heerdt, Ruth; Schmidt, Felix; and Thiel, Max, 4,053,624, Cl. 424-274.000.

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Boger, Allen D., Jr.: *See*—
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Bohman, Gote Bertil Sivert: *See*—
Wulker, Jan-Eric Lennart; and Bohman, Gote Bertil Sivert, 4,053,265, Cl. 425-20.000.

Bolin, Philip C., to Westinghouse Electric Corporation. Method of fabricating compressed gas insulated cable. 4,053,338, Cl. 156-48.000.

Boller, Arthur: *See*—
Scherrer, Hanspeter; and Boller, Arthur, 4,053,431, Cl. 252-299.000.

Bolme, Donald W. Removal of nitrogen oxides from industrial gases by use of oxidizing solutions in which nitrates are the oxidants. 4,053,555, Cl. 423-235.000.

Bolt, Kenneth D.: *See*—
Houston, Herbert J.; and Bolt, Kenneth D., 4,053,706, Cl. 174-149.00R.

Bongard, Mathieu, to Stamicarbon, N.V. Process and installation for preparing urea from ammonia and carbon dioxide. 4,053,508, Cl. 260-555.00A.

Bonnet, Jean Claude; and Ribba, Alain. Latex compositions sensitive to heat. 4,053,440, Cl. 260-4.00R.

Bonsen, Pieter; Laver, Myron B.; and Morris, Kent C., to Alza Corporation. Compositions of matter comprising macromolecular hemoglobin. 4,053,590, Cl. 424-177.000.

Boocock, John Roger; and Oughton, Richard Walton, to Du Pont of Canada Ltd. Extraction of oil from oats. 4,053,492, Cl. 260-412.400.

Booth, Newell O.; and Hippenstiel, Ralph D., to United States of America, Navy. Acoustic hologram reconstructor using surface acoustic wave devices. 4,053,867, Cl. 340-5.00H.

Boots Company Limited, The: *See*—
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Borg-Warner Corporation: *See*—
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Warner, John Craig; and Gravel, Mark William, 4,052,909, Cl. 74-231.00P.

Borginon, Hendrik Alfons; and Vanassche, Willy Joseph, to AGFA-GEVAERT, N.V. Photodevelopable silver halide material. 4,053,315, Cl. 96-63.000.

Born, Manfred: *See*—
Teichner, Otwald; and Born, Manfred, 4,053,212, Cl. 351-32.000.

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Borsatti, Mario: *See*—
Argurio, Federico; Borsatti, Mario; and Heindrijckx, Jan, 4,053,540, Cl. 260-897.00B.

Bos, Cornelis; and Daamen, Jacobus J. H. G., to Akzona Incorporated. Apparatus and method for heating threads. 4,053,277, Cl. 432-60.000.

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Bossert, Friedrich: *See*—
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Boullier, Francois M.: *See*—
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Bourke, Donall Garraid; and Vergari, Louis Peter, to International Business Machines Corporation. Residual status reporting during chained cycle steal input/output operations. 4,053,950, Cl. 364-200.000.

Bourns, Inc.: *See*—
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Bouzard, Daniel; and Weber, Abraham, to Bristol-Myers Company. Enzymatic preparation of 6-D-(−)-α-amino-α-(p-hydroxyphenylacetamino)penicillin acid. 4,053,360, Cl. 195-29.000.

Bovender, Coy R. Nasal filter. 4,052,983, Cl. 128-140.00N.

Bovill, Anthony Wulston: *See*—
Torlesse, Arthur Timothy; Bovill, Anthony Wulston; and West, Robert Charles, 4,053,877, Cl. 340-258.00R.

Bower, Gerald S.; and Voelker, Scott F., to Systron Donner Corporation. Oscillation means for generating a differential AC signal proportional to movement of a conducting member. 4,053,849, Cl. 331-65.000.

Boyer, Francis, to Societe Francaise d'Equipements pour la Navigation Aerienne S.F.E.N.A. Method of and apparatus for indicating the geographical position of a pilot vehicle. 4,053,893, Cl. 343-112.0PT.

Boyle, John Terence Arnott; and Saunders, John Christopher, to John Wyeth & Brother Limited. Phthalimidopiperidines and anti-convulsant compositions thereof. 4,053,615, Cl. 424-267.000.

Bradford, James L.; and Ore', Fernando, to Occidental Petroleum Company. Extraction process for purification of phosphoric acid. 4,053,564, Cl. 423-321.00S.

Brammer, Chris M., Jr., to Westinghouse Electric Corporation. Guide device. 4,053,356, Cl. 176-30.000.

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Buchel, Karl Heinz; Kramer, Wolfgang; Brandes, Wilhelm; and Frohberger, Paul-Ernst, 4,053,616, Cl. 424-269.000.

Branham, William C.; Garlapaty, Venkat R.; and Berg, David W., to Tol-O-Matic, Inc. Wheel brake assembly. 4,053,036, Cl. 192-13.00R.

Brass, John R., to U.S. Industries, Inc. Lamp lens structure. 4,053,766, Cl. 362-301.000.

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Braytenbah, Andrew; and Podolsky, Leaman, to Westinghouse Electric Corporation. System and method for operating a steam turbine with digital computer control having integrator limit. 4,053,746, Cl. 364-494.000.

Breitenbach, Otto, to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Apparatus for transmitting high frequency signals. 4,053,835, Cl. 325-51.000.

Breiter, Manfred Wolfgang, to Electric Power Research Institute, Inc. Contact between metal can and carbon/graphite fibers in sodium/sulfur cells. 4,053,689, Cl. 429-102.000.

Brendel, Albert E.; and Rykwalder, Stanley J., to Lebow Associates, Inc. Tire balancing transducer. 4,052,905, Cl. 73-483.000.

Breslow, Jeffrey D.; and Jaworski, Eugene, to Marvin Glass & Associates. Skill-type board game. 4,053,158, Cl. 273-135.00R.

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Bridger, Robert F.; Audeh, Costandi A.; and Heiba, El-Ahmadi I., to Mobil Oil Corporation. Process for upgrading lubricating oil stock. 4,053,387, Cl. 208-88.000.

Bridgestone Tire Company, Ltd.: *See—*
Watabe, Yoji; Ishii, Michio; Iseda, Yutaka; Komatsu, Kouei; Ohshima, Noboru; and Nakata, Yozo, deceased, 4,053,446, Cl. 260-37.00N.

Brinkhoff, Carl H., to Mine Safety Appliances Company. Earplug package and method of making it. 4,053,051, Cl. 206-438.000.

Brinkley, Jerry A. Decorative item. 4,053,761, Cl. 362-413.000.

Brinkmann, Dale C.: *See—*
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Bristol-Myers Company: *See—*
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British Petroleum Company Limited, The: *See—*
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Broadwin, Alan: *See—*
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Brockway, Brock F., to E. D. Bullard Company. Plenum type air distribution system for head enclosure. 4,052,984, Cl. 128-142.700.

Brosa Rabassa, Salvador: *See—*
Hosta Pujol, Alfonso; and Brosa Rabassa, Salvador, 4,053,483, Cl. 260-325.00R.

Brown, Arthur K., to Bendix Corporation, The. Hydraulic brake booster having independent reserve systems. 4,052,851, Cl. 60-404.000.

Brown, David; and Tobias, Reginald, to Block Engineering, Inc. Dissimilar materials seal for high pressure, high temperature and chemically reactive environments. 4,053,085, Cl. 220-378.000.

Brown, Milton Reese, Jr., to Bourns, Inc. Linear motion coupling. 4,053,865, Cl. 338-180.000.

Brown, Thomas Graham; Skrgatic, Damir Josip Miroslav; Younger, Graeme William; and Fortune, John Cook, to Sonicaid Limited. Apparatus for the ultrasonic examination of bodies having non-planar surfaces. 4,052,888, Cl. 73-67.80S.

Browne Engineering Corporation: *See—*
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Browne, Lawrence T., to Browne Engineering Corporation. Pressure and volume recording apparatus. 4,052,892, Cl. 73-149.000.

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Brucat, John N., to Instructional Communications Technology, Inc. Advance mechanism. 4,053,214, Cl. 352-191.000.

Bruderhaus Maschinen GmbH, Firma: *See—*
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Bruenemann, Hilmar; Eilingsfeld, Heinz; and Lach, Dietrich, to BASF Aktiengesellschaft. Separation of 1,5-dinitroanthraquinone and 1,8-dinitroanthraquinone. 4,053,488, Cl. 260-369.000.

Brug, James E.; and Heidelberg, Eric X., to Owens-Illinois, Inc. Methods of recovering terbium oxide from a glass. 4,053,551, Cl. 423-21.000.

Brunswick Corporation: *See—*
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Kimmel, Richard; and Pickens, Robert C., Jr., 4,053,668, Cl. 428-95.000.

Bryant, Charles Peterson: *See—*
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Bub, Robert A., to Mine Safety Appliances Company. Hydraulically-actuated cable cutter. 4,052,922, Cl. 83-639.000.

Buchel, Karl Heinz; Kramer, Wolfgang; Brandes, Wilhelm; and Frohberger, Paul-Ernst, to Bayer Aktiengesellschaft. Combating rust fungi with 1-[1',2',4'-triazolyl-(1')]-1-(4'-phenyl-phenoxy)-3,3-dimethyl-butan-2-one. 4,053,616, Cl. 424-269.000.

Buck, George Sumner, Jr.; Weyker, Robert George; and Ward, Arthur Gerard, to Fiberlok, Inc. Glow-resistant batt and process for producing such. 4,053,673, Cl. 428-283.000.

Buck, George Sumner, Jr.; Weyker, Robert George; and Ward, Arthur Gerard, to Fiberlok, Inc. Glow-resistant batt and process for producing such. 4,053,674, Cl. 428-283.000.

Buck, Michael D.: *See—*
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Bucyrus-Erie Company: *See—*
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Buick, James A., to Best Line Warehouse, Inc. Encavitated steel rule die. 4,052,886, Cl. 93-58.300.

Bumstead Woolford Co.: *See—*
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Bunk, Stanley: *See—*
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Bunker Ramo Corporation: *See—*
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Burba, Christian; and Borner, Peter, to Schering Aktiengesellschaft. Process for the dimerization of heptadiene acid esters. 4,053,503, Cl. 560-202.000.

Burkard, Charles M.; and Bock, Edward C., to Xerox Corporation. Document handling system. 4,053,224, Cl. 355-76.000.

Burkhardt, Jurgen, to Wacker-Chemie GmbH. Preparation of organopolysiloxanes. 4,053,494, Cl. 260-448.20E.

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Burr, Peter; Joy, Richard C.; and Ziegler, James F., to International Business Machines Corporation. Method and structure for controllng carrier lifetime in semiconductor devices. 4,053,925, Cl. 357-64.000.

Burroughs Corporation: *See—*
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Burrus, Billy Steve, to Combustion Engineering, Inc. Fluid pressure relay. 4,052,996, Cl. 137-85.000.

Bursk, William M.: *See—*
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Bush, Robert E.: *See—*
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Buttner-Schilde-Haas Aktiengesellschaft: *See—*
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Cable, Jesse F., III: *See—*
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Cahalan, Patrick Thomas; Peterson, John Allen; and Arndt, Douglas Arthur, to General Mills Chemicals, Inc. Flash drying of xanthan gum and product produced thereby. 4,053,699, Cl. 536-114.000.

Caldwell, Laurence B.; Helman, Robert W.; and Pellatiro, Leonard P., to Bethlehem Steel Corporation. Method of treating ferrous strand for coating with aluminum-zinc alloys. 4,053,663, Cl. 427-320.000.

Calgon Corporation: *See—*
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California Institute of Technology: *See—*
Berdahl, C. Martin, 4,053,774, Cl. 250-355.000.
Clauser, Francis H., 4,052,973, Cl. 123-32.0ST.

California Linear Circuits, Inc.: *See—*
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California Quartzware Corporation: *See—*
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Camac, Morton: *See—*
Bien, Fritz; Camac, Morton; and Gersh, Michael Elliot, 4,053,233, Cl. 356-141.000.

Campbell, Ramsey G., to Stauffer Chemical Company. Purification of gas streams containing ferric chloride. 4,053,558, Cl. 423-240.000.

Canadian PGL Electronics Inc.: *See—*
Long, Robert G., 4,053,714, Cl. 179-15.0AL.

Cannistra, Anthony T.; and Petrosky, Joseph A., Jr., to International Business Machines Corporation. Low power complementary field effect transistor (CFET) logic circuit. 4,053,792, Cl. 307-205.000.

Cannon, Jack W., to International Business Machines Corporation. Method and apparatus for improving the clarity and character density on a dot matrix video display. 4,053,878, Cl. 340-324.0AD.

Canon Kabushiki Kaisha: *See—*
Aizawa, Hiroshi; Hosoe, Kazuya; Matsumoto, Seiichi; and Yokota, Hideo, 4,053,240, Cl. 356-4.000.
Hara, Toshitami; Hajimoto, Yoshioki; Shirato, Yoshiaki; and Matsushima, Masaaki, 4,053,209, Cl. 350-160.00R.
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, 4,053,898, Cl. 346-1.000.
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Okuno, Youichi; and Yokota, Hideo, 4,053,912, Cl. 354-225.000.
Sado, Ichiro; Kishimoto, Juji; Saito, Seiji; and Sakurai, Atsushi, 4,053,753, Cl. 2364-709.000.
Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Nakamoto, Soichi, 4,053,909, Cl. 354-105.000.
Tanaka, Hiroshi; Takahashi, Shinkichi; Takahashi, Touru; Tsukada, Shusei; and Marushima, Giichi, 4,053,770, Cl. 250-324.000.

Cantrell, Ben H.; and Lewis, Bernard L., to United States of America, Navy. High prf unambiguous range radar. 4,053,884, Cl. 343-7.700.

Cantrell, Steve Garner: *See—*
Besenfelder, Edward Roald; and Cantrell, Steve Garner, 4,053,738, Cl. 235-92.0PB.
Carle, Albert S. Pea and bean cutter. 4,052,790, Cl. 30-287.000.
Carlin, William W., to PPG Industries, Inc. Electrolytic production of hydrogen iodide. 4,053,376, Cl. 204-103.000.
Carlisle, Richard S. Article having edge-sealed films. 4,053,671, Cl. 428-157.000.
Carlsson, Karl-Johan Werner; and Sjoqvist, Erik Ivar, to Telefonaktiebolaget L M Ericsson. Method and apparatus for executing sequential data processing instructions in function units of a computer. 4,053,947, Cl. 364-200.000.
Carnmalm, Bernt Sigfrid Emanuel; De Paulis, Tomas; Ross, Svante Bertil; Ramsby, Sten Ingvar; Stjernstrom, Nils-Erik; and Ogren, Sven-Ove, to Astra Lakemedel Aktiebolag. Compounds of spiroamine type and methods for their use. 4,053,632, Cl. 424-316.000.
Carnmalm, Bernt Sigfrid Emanuel; Lindberg, Ulf Henrik Anders; de Paulis, Tomas; Ross, Svante Bertil; Stjernstrom, Nils-Erik; Ulff, Carl Bengt Johan; and Ogren, Sven-Ove, to Astra Lakemedal Aktiebolag. Compounds of diphenylcyclopentylamine type and methods for their uses. 4,053,637, Cl. 424-330.000.
Carre, Jean Jacques, to Societe Anonyme D.B.A. Dual braking correction device. 4,053,185, Cl. 303-6.00C.
Carter, Frank H. Portable electric room air heater. 4,053,732, Cl. 219-365.000.
Carter, J. Warne, to Ciba-Geigy Corporation. Methods of making fiber reinforced plastic pipe. 4,053,343, Cl. 156-172.000.
Carter, Melvin Keith, to Envirotech Corporation. Method and apparatus for determining organic carbon in sulfureous compounds. 4,053,281, Cl. 23-230.0PC.
Cartwright, William F.; Means, Richard E.; Kallianos, Andrew G.; and Ross, J. Bowen, Jr., to Liggett & Myers Incorporated. Cinnamic derivatives as tobacco additives. 4,052,993, Cl. 131-9.000.
Caruel, Jacques Emile Jules; Quillevere, Herve Alain; and Gastebois, Philippe Marc Denis, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Gas turbine combustion chambers. 4,052,844, Cl. 60-39.650.
Casey, Harry B., to Westvaco Corporation. Measuring the surface of a roller by glossmeter. 4,053,237, Cl. 356-209.000.
Castellucci, Nicholas T.; and Bosso, Joseph F., to PPG Industries, Inc. Method of improving corrosion resistance of metal substrates by passivating with an onium salt-containing material. 4,053,329, Cl. 148-6.15R.
Catalox Corporation: *See—*
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Collins, William H., 4,053,337, Cl. 149-37.000.
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Frantzreb, John G., Sr., 4,053,120, Cl. 242-115.000.
Grawey, Charles E., 4,053,272, Cl. 425-302.100.
Hart, Cullen P., 4,052,852, Cl. 60-478.000.
Jorgensen, Stanley A.; and Myers, Kenneth R., 4,053,179, Cl. 296-28.00C.
Kuhfuss, Alvin L., Jr., 4,053,409, Cl. 210-130.000.
Lanz, William E.; and Stepe, Visvaldis A., 4,052,803, Cl. 37-141.00T.
Lorimor, Larry W., 4,053,410, Cl. 210-132.000.
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Simmons, Gerald P.; Brubaker, Hiram A.; and Streight, William E., 4,053,241, Cl. 350-310.000.
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Stedman, Robert N., 4,053,016, Cl. 172-1.000.
Stedman, Robert N., 4,053,075, Cl. 214-770.000.
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Hawkins, Joseph Key; and Cavanaugh, Leo Francis, 4,053,931, Cl. 358-134.000.
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Ceideburg, John W. Solar heat collector and storage system. 4,052,975, Cl. 126-271.000.
Central Electricity Generating Board: *See—*
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Centre Electronique Horloger S.A.: *See—*
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Chadwick-Helmuth Company, Inc.: *See—*
Chadwick, James R., 4,053,123, Cl. 244-17.110.
Chadwick, James R., to Chadwick-Helmuth Company, Inc. Method and apparatus to determine need for rotor blade pitch adjustment and/or blade substitution. 4,053,123, Cl. 244-17.110.
Chalmers, Wallace G. Rubber spring and vehicle suspension incorporating said spring. 4,053,148, Cl. 267-63.00R.
Champion International Corporation: *See—*
Story, Charles F.; and Gibson, Donald B., 4,053,339, Cl. 156-62.200.
Chaplin, Gary Francis; and Schwarz, Frederick Michael, to United Technologies Corporation. Turbine case cooling system. 4,053,254, Cl. 415-116.000.
Chapman, James Mood, Jr.: *See—*
Wagener, Kenneth Boone; Spivey, Bron Walter, Jr.; and Chapman, James Mood, Jr., 4,053,441, Cl. 260-18.00N.
Chapman, Ward W. Semi-prefabricated monolithic steel-reinforced cement building construction. 4,052,829, Cl. 52-285.000.
Chardonneau, Joel; and Sable, Claude, to Centre d'Etudes et de Realisations Industrielles de l'Atlantique (Ceria). Pumping device for wells, such as oil wells. 4,052,907, Cl. 74-89.220.
Charter-Wallace, Inc.: *See—*
Hunter, H. Eric, 4,052,779, Cl. 29-429.000.
Chase, Douglas, Sr. Bicycle. 4,053,173, Cl. 280-253.000.
Chemplex Company: *See—*
Liu, Joseph; Grimmett, Howard L.; and Hwang, Yu-Tang, 4,053,437, Cl. 252-458.000.
Chen, Gilbert K. C.; and Crosby, Lincoln B., to Monsanto Company. Fiber bed separator. 4,053,290, Cl. 55-187.000.
Chevako, Robert J.: *See—*
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Chevron Research Company: *See—*
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Chien, Yie W.; and Lambert, Howard J., to G. D. Searle & Co. Microsealed pharmaceutical delivery device. 4,053,580, Cl. 424-15.000.
Chino, Jiro; and Nakada, Kazuhiko, to Meji Seika Kaisha Ltd. Baked confections and process for the preparation thereof. 4,053,650, Cl. 426-304.000.
Chisholm, Douglas B. Breakaway coupling assembly with fracture-initiating washer. 4,052,826, Cl. 52-98.000.
Chloride Group Limited: *See—*
Peters, Kenneth; Fewster, Sidney; Wilson, Frank; and Kearney, Kevin David Nicolas, 4,053,695, Cl. 429-225.000.
Chlystek, Stanley J., to Armstrong Cork Company. Low-smoke generating polyurethane foam. 4,053,439, Cl. 260-2.5AJ.
Chorvat, Robert J.; and Pappo, Raphael, to G. D. Searle & Co. 7-Aza-6-alkoxy-1-tetralones. 4,053,476, Cl. 260-289.00D.
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Christensen, Thorkild: *See—*
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Fory, Werner; Fischer, Hanspeter; Lohmann, Dieter; and Greber, Gerd, 4,053,497, Cl. 260-448.80R.
Roueche, Armand, 4,053,464, Cl. 260-174.000.
Schneider, Jurg; and Fattinger, Volker, 4,053,292, Cl. 55-227.000.
Ciko, John D.; Cramer, John J.; and Jamieson, Geoffrey A., to BASF Wyandotte Corporation. Compositions for souring and softening laundered textile materials, method of preparing the same, and stock solutions prepared therefrom. 4,053,423, Cl. 252-8.750.
Ciliberti, Frank L., Jr., to P. R. Mallory & Co., Inc. Porous light weight battery filler. 4,053,691, Cl. 429-163.000.
Cimarusti, Christopher M.: *See—*
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Clark, Karen. Mist shield for house plants. 4,052,815, Cl. 47-1.00R.

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Clauser, Francis H., to California Institute of Technology. Internal combustion engine and a process for its operation. 4,052,973, Cl. 123-32.0ST.

Clemens, Donald L.; and Edmiston, Steven A. Fiber reinforced plastic handrail system. 4,053,140, Cl. 256-19.000.

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Clitheroe, Jay B.; and Sudderth, Robert Brantley, to General Mills Chemicals Co.; and Mineral & Chemical Resource Co. Solvent extraction of zinc from sulfite-bisulfite solution. 4,053,552, Cl. 423-100.000.

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Cochran, Michael J., to Texas Instruments Incorporated. Low level field effect transistor amplifier. 4,053,795, Cl. 307-350.000.

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Coffer, Carl E. Power generating apparatus. 4,053,253, Cl. 415-5.000.

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Cohn, Charles C. Matchbooks. 4,053,048, Cl. 206-106.000.

Cohn, James Myron. Electrical control devices. 4,052,923, Cl. 84-1.070.

Coibion, Jean; and Lafaye, Jean, to SAFT-Societe des Accumulateurs Fixes et de Traction. Electrochemical cell. 4,053,687, Cl. 429-94.000.

Cole, Cody Jack. Cuff linking device. 4,052,771, Cl. 24-102.0SL.

Cole, James B., to Boeing Company, The. Variable camber airfoil. 4,053,124, Cl. 244-219.000.

Cole, Thomas Walter: *See—*
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Coleman, D. Jackson; and Trokel, Stephen L. Apparatus for medicinally spraying an eyeball. 4,052,985, Cl. 128-173.00R.

Coleman, Richard L., to Texaco Inc. Grease containing synergistic extreme pressure additives. 4,053,424, Cl. 252-32.70E.

Coleman, Trevor Norman, to USM Corporation. Support for attaching heels to shoes. 4,053,095, Cl. 227-135.000.

Coles Cranes Limited: *See—*
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Collier, John R.; and Tam, Thomas Y. T., to Research Corporation. Apparatus for the extrusion of highly oriented polymeric materials. 4,053,270, Cl. 425-144.000.

Colling, Ronald L.; Trenne, Myron U.; and Schlax, Timothy R., to General Motors Corporation. Digital electronic ignition spark timing system. 4,052,967, Cl. 123-117.00D.

Collins, Carl B., Jr. Repetitively pulsable traveling wave laser. 4,053,853, Cl. 331-94.5PE.

Collins, Johnny, to Zenith Radio Corporation. Adaptive phase locked loop filter for television tuning. 4,053,933, Cl. 358-191.000.

Collins, Robert H., III; Steele, William J.; and Thomas, Albert L., Jr., to United States of America, Army. Contour fitting pictorial tracking gate. 4,053,929, Cl. 358-126.000.

Collins, William H., to Catalyst Research Corporation. Heating composition. 4,053,337, Cl. 149-37.000.

Combs, Donald R., to Bumstead Woolford Co. Combination dust collector and heat exchanger. 4,053,293, Cl. 55-269.000.

Combustion Engineering, Inc.: *See—*
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Bergez, Pierre; Lacroix, Roger; Plurien, Pierre; and Touboul, Jean-Paul, 4,053,662, Cl. 427-250.000.
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Communications Satellite Corporation: *See—*
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Compagnie Europeenne d'Accumulateurs S.A.: *See—*
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Compagnie Generale pour les Developpements Operationnels des Richesses Sous-Marines "C.G. Doris": *See—*
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COMPUDRIVE Corporation: *See—*
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Connelly, Dennis E. Tube bending apparatus. 4,052,878, Cl. 72-293.000.

Connelly, Henry V., Jr.: *See—*
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Consortium fur Elektrochemische Industrie GmbH: *See—*
Deinhammer, Wolfgang; Frey, Volker; Wick, Manfred; and Riedle, Rudolf, 4,053,495, Cl. 260-448.20E.

Constant, James N. Feedforward filter. 4,053,750, Cl. 364-724.000.

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Cook, Robert D., to Crane Co. Single gain skid control valve and skid control system. 4,053,187, Cl. 303-93.000.

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Corao, Manuel J. Light concrete monolithic slab. 4,053,677, Cl. 428-310.000.

Corbin, Edgar A., Jr., to Diamond Shamrock Corporation. Process for increasing cheese curd yield. 4,053,643, Cl. 426-40.000.

Cordes, Claus; and Zahradnik, Franz, to BASF Aktiengesellschaft. Manufacture of polyamides. 4,053,457, Cl. 260-78.00L.

Cornelius Printing Co.: *See—*
Lane, Leslie A., 4,053,150, Cl. 270-67.000.

Corte, Francisco Barcelloni. Labeling device. 4,053,041, Cl. 197-6.700.

Cosar Corporation: *See—*
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Costa, Hilario Simoes: *See—*
Lee, Sung Chuel; Podany, Vaclav Oldrich; and Costa, Hilario Simoes, 4,053,785, Cl. 250-574.000.

Cougar Instruments Corporation: *See—*
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Coughlin, Charles Paul; and Faure, Louis Henry, to International Business Machines Corporation. Method of obtaining proper probe alignment in a multiple contact environment. 4,052,793, Cl. 33-180.00R.

Coultas, Thomas A., to United States of America, Energy Research and Development Administration. Bumper wall for plasma device. 4,052,999, Cl. 138-158.000.

Courvoisier, Jean-Claude F.; Meylan, Jean-Luc Ch.; Gross, Daniel M.; and Fournier, Jacques Pierre D., to Battelle Memorial Institute. Process for the purification of water. 4,053,368, Cl. 203-10.000.

Cowan, Gary J. Board game apparatus. 4,053,157, Cl. 273-134.0AT.

Cox, Harrison F.; Cochran, Thomas E.; Fratzke, Lawrence F.; and Fuzzell, Joe E., to Caterpillar Tractor Co. Vehicle system monitor. 4,053,868, Cl. 340-52.00F.

Cox, James R.: *See—*
Hampton, Perry Dwaine; and Cox, James R., 4,053,235, Cl. 356-188.000.

Crabtree, Philip G. Collapsible fish spear. 4,052,808, Cl. 43-6.000.

Crain, Philip Warren; Gabler, Otto Leonhard; and Kilroy, Eugene Joseph, Jr., to Mattel, Inc. Animated toy. 4,052,813, Cl. 46-119.000.

Cramer, John J.: *See—*
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Crees, Silas R. Cable bender. 4,052,879, Cl. 72-318.000.

Cricchi, James R.; and Fitzpatrick, Michael D., to Westinghouse Electric Corporation. Silicon on sapphire MOS transistor. 4,053,916, Cl. 357-23.000.

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Crowther, John C., to Albright & Wilson Limited. Chromium electroplating baths. 4,053,374, Cl. 204-51.000.

Csizy, Tibor; Karpat, Arpad; and Melis, Janos, to Villamos Berendezes es Keszulek Muvek. Fuse-element for fuses used in electric networks. 4,053,862, Cl. 337-221.000.

CTS Corporation: *See—*
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Cull, Neville L.; and Eberly, Paul E., Jr., to Exxon Research & Engineering Co. Gas desulfurization process. 4,053,574, Cl. 423-573.00G.

Cullinan, Robert L.; Jay, Ronald W.; Beck, Keith; and Miller, Lloyd J., to Foulks, Noah E. Pipe perforating machine. 4,052,880, Cl. 72-326.000.

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Baude, Frederic John; and Cupery, Willis Eli, 4,053,612, Cl. 424-286.000.

Cushman, David W.: *See—*
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Tkac, Alexander; and Cvengros, Jan, 4,053,006, Cl. 159-6.00W.

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D. Swarovski & Co.: *See*—
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Daamen, Jacobus J. H. G.: *See*—
Bos, Cornelis; and Daamen, Jacobus J. H. G., 4,053,277, Cl. 432-60.000.

Dacapo AB: *See*—
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Daft, Willis R.: *See*—
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Daicel, Ltd.: *See*—
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Damm, Jerry S.: *See*—
Damm, William R.; and Damm, Jerry S., 4,053,219, Cl. 355-27.000.

Damm, William R.; and Damm, Jerry S. Device for use in photographically printing enlarged copies of color images. 4,053,219, Cl. 355-27.000.

Dana Corporation: *See*—
Duncan, John D., 4,052,785, Cl. 29-605.000.

Danfoss A/S: *See*—
Baatrup, Johannes Vagn; and Christensen, Thorkild, 4,052,929, Cl. 91-29.000.

Daniels, Dennis, to U.S. Amada, Ltd. Punching, contouring, handling apparatuses and method. 4,052,780, Cl. 29-558.000.

Daniels, Peter J. L.; and McCombie, Stuart W., to Schering Corporation. 5-Deoxy-4,6-di-O-(aminoglycosyl)-1,3-diaminocyclitols, methods for their manufacture, method for their use as antibacterial agents and compositions useful therefor. 4,053,591, Cl. 424-180.000.

Darda, Helmut. Spring drive mechanism, particularly for mobile toys. 4,053,029, Cl. 185-39.000.

Das, Subodh K.: *See*—
Cochran, C. Norman; Das, Subodh K.; and Milito, Richard A., 4,053,303, Cl. 75-68.00A.

Daublebsky, Peter, to Kraftwerk Union Aktiengesellschaft. Protective device against rupture of large cylindrical vessels and method of manufacturing same. 4,053,080, Cl. 220-3.000.

Daum, Werner; and Frohberger, Paul-Ernst, to Bayer Aktiengesellschaft. Preparation of 2,4-dioxo-1,2,3,4-tetrahydro-s-triazino-[1,2-a]-benzimidazoles. 4,053,598, Cl. 424-248.560.

Dauthuille, Roger. Economizer device for exploiting the thermal output of heating installations. 4,052,962, Cl. 122-20.00A.

Davidson, James P.; Rosenberg, Barnett; and Hinz, Ronald W., to Research Corporation. Method of treating viral infections. 4,053,587, Cl. 424-131.000.

Davis, Charles W.: *See*—
Salzgeber, Daniel E.; Raufeisen, Robert; and Davis, Charles W., 4,052,971, Cl. 123-139.0AQ.

Davis, Guy E., to Westinghouse Electric Corporation. System for initializing a backup computer in a multiple computer electric power plant and turbine control system to provide turbine and plant operation with reduced time for backup computer availability. 4,053,747, Cl. 364-494.000.

Davis, Larry: *See*—
Effland, Richard C.; Davis, Larry; and Schaub, Wolfgang, 4,053,599, Cl. 424-250.000.

Davis, Robert H.; and Schick, John W., to Mobil Oil Corporation. Lubricant compositions. 4,053,426, Cl. 252-34.000.

Davis, Thomas Francis, to AMP Incorporated. Tin-lead acidic plating bath. 4,053,372, Cl. 204-43.00S.

Day, John Herbert, to AMF Incorporated. Cigarette package inspection apparatus. 4,053,056, Cl. 209-73.000.

Day, Roger W.; Ormsby, George S.; and Rich, Elvis, to Picenco International, Inc. Cyclone assembly. 4,053,393, Cl. 209-211.000.

De Laval Turbine Inc.: *See*—
Raymond, Robert E., 4,053,137, Cl. 251-65.000.

DeBard, Andre, to Aerosol Inventions & Development S.A. Aid SA. Pumps for hand-held dispensers. 4,053,086, Cl. 222-182.000.

DeBaun, Kenneth W., to Air Monitor Corporation. Methods and apparatus for determining total flow rate of gaseous fluids. 4,052,897, Cl. 73-212.000.

Debortoli, George; and Zimmermann, Detlef, to Northern Telecom Limited. Connector blocks for telecommunications lines. 4,053,719, Cl. 179-98.000.

Dedo, Richard G. Knee spacer and method of rejoining sliding body surfaces. 4,052,753, Cl. 3-1.000.

Deetz, David R., to Xerox Corporation. Means and method for enhancing ribbon lift. 4,053,043, Cl. 197-53.000.

DeFelice, Amedio. Child safety cap. 4,053,077, Cl. 215-217.000.

DeForest, William S.; and Connelly, Henry V., Jr., to Rockwell International Corporation. Chemical machining of silica and glass. 4,053,351, Cl. 156-661.000.

DeFreitas, Richard E.; and Wilensky, Samuel, to Audio Pulse, Inc. Simulation of reverberation in audio signals. 4,053,711, Cl. 179-1.0GQ.

Degeye, Guy; and Filaine, Roger, to Paul Journee S.A. Barrel having tumbler plates for a cylindrical lock. 4,052,870, Cl. 70-364.00R.

Deinhammer, Wolfgang; Frey, Volker; Wick, Manfred; and Riedle, Rudolf, to Consortium fur Elektrochemische Industrie GmbH. Process for preparing methylchlorosilanes. 4,053,495, Cl. 260-448.20E.

DeJohn, Patrick Fred; Hoff, Charles Edwin; Tennison, Robert Douglas; and Young, James Clair, Jr., to International Business Machines Corporation. Error recovery and control in a mass storage system. 4,053,752, Cl. 235-302.100.

DeKeyser, Richard A.; and Parks, John H., to Caterpillar Tractor Co. Warning device and method for fuel filtering systems. 4,053,405, Cl. 210-65.000.

Della Grotta, Guerino D.: *See*—
Barbieri, Marcello, 4,053,779, Cl. 250-445.00T.

Della Grotta, Nicholas: *See*—
Barbieri, Marcello, 4,053,779, Cl. 250-445.00T.

De Lorenzo, Bruce L.; and McCarthy, Daniel J. Leak detection arrangement for valve having sealing means. 4,052,997, Cl. 137-312.000.

Del Pozzo, James Anthony. Shelf support. 4,053,132, Cl. 248-235.000.

Delsarte, Jacques, to Produits Chimiques Ugine Kuhlmann. Process for the preparation of grafted copolymers. 4,053,539, Cl. 260-878.00R.

Delta Scientific Corporation: *See*—
Kushner, Jack; and Zwirblis, Henry G., 4,052,904, Cl. 73-421.00R.

Delves, Elsworth Richard, to Purpose Engineers Limited. Apparatus for controlling the size of a gap. 4,052,958, Cl. 118-119.000.

Delves, Elsworth Richard, to Purpose Engineers Limited. Brake shoe grinding jig. 4,053,287, Cl. 51-105.00R.

deMarshall, August Cesar: *See*—
Zeck, Walter Maria; deMarshall, August Cesar; and Wybou, Andre Prosper, 4,053,595, Cl. 424-216.000.

de Mey, Charles F., II: *See*—
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Carnmalm, Bernt Sigfrid Emanuel; Lindberg, Ulf Henrik Anders; de Paulis, Tomas; Ross, Svante Bertil; Stjernstrom, Nils-Erik; Ulff, Carl Bengt Johan; and Ogren, Sven-Ove, 4,053,637, Cl. 424-330.000.

Dersh, Bruce A.; and Chevako, Robert J., to United States of America, Air Force. Mosaic infrared sensor. 4,053,773, Cl. 250-349.000.

Derveaux, Oscar, to Soprogespar Societe de Promotion et de Gestion de Participations. Automatic telephone call generator. 4,053,718, Cl. 179-90.00B.

DeSantis, Raymond P., to Wolverine Aluminum Corporation. Die and punch assembly for compacting powder material. 4,053,267, Cl. 425-78.000.

DeSimone, Robert S., to Polak's Frutal Works, Inc. Propene trimer alcohol perfume compositions. 4,053,438, Cl. 252-522.000.

Deslauriers, Paul C.; Voelker, Richard P.; Lecourt, Everett J.; and Schultz, Lawrence A., to Artec, Incorporated. Apparatus and method for recovering oil from icy waters. 4,053,406, Cl. 210-71.000.

Desmarchais, Walter E.: *See*—
Katz, Leonard R.; Marshall, James R.; and Desmarchais, Walter E., 4,053,067, Cl. 214-18.00N.

Deutsch, Leslie J.: *See*—
Deutsch, Ralph; and Deutsch, Leslie J., 4,052,924, Cl. 84-1.240.

Deutsch, Ralph; and Deutsch, Leslie J., to Kawai Musical Instrument Mfg. Co. Ltd. Interval repeat generator for keyboard musical instrument. 4,052,924, Cl. 84-1.240.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See*—
Schwarze, Werner; and Wolff, Siegfried, 4,053,461, Cl. 260-125.000.

Deverich, Daniel L.: *See*—
Gits, Gerald B.; and Deverich, Daniel L., 4,052,940, Cl. 102-33.000.

Dexter Corporation, The: *See*—
Vogel, Richard W.; Suciu, Nick N., IV; Glaser, Milton A.; and Szwedo, John A., 4,053,076, Cl. 215-12.00R.

Dey, Arabinda N., to P. R. Mallory & Co., Inc. Hermetically sealed cells. 4,053,692, Cl. 429-171.000.

Dhingra, Ashok Kumar: *See*—
Riewald, Paul Gordon; Krueger, William Henry; and Dhingra, Ashok Kumar, 4,053,011, Cl. 164-97.000.

Diamond Shamrock Corporation: *See*—
Corbin, Edgar A., Jr., 4,053,643, Cl. 426-40.000.

Dieck, Ronald L.; and Quinn, Edwin J., to Armstrong Cork Company. Poly(aryloxyphosphazene) copolymers. 4,053,456, Cl. 260-47.00P.

Diepers, Heinrich; Schmidt, Otto; and Musebeck, Horst, to Siemens Aktiengesellschaft. Method for the manufacture of a tubular conductor suitable for superconducting cables. 4,052,784, Cl. 29-599.000.

Diggs, Richard E. Modular hydroelectric power plant. 4,053,787, Cl. 290-54.000.

Di Gregorio, Francesco: *See*—
Giongo, Matteo; Marconi, Walter; Palladino, Nicola; and Di Gregorio, Francesco, 4,053,521, Cl. 260-618.00H.

Dill, Douglas W., to S. C. Johnson & Son, Inc. Low temperature glazing method. 4,053,664, Cl. 427-379.000.

Dill, Frederick H.; and Hauge, Peter S., to International Business Machines Corporation. Rotating-compensator ellipsometer. 4,053,232, Cl. 356-118.000.

Dively, Charles R., to Ingersoll-Rand Company. Compression coupling means for a raise boring head. 4,053,244, Cl. 403-13.000.

Dixon, Jerry Duane, to International Business Machines Corporation. Microprocessor controlled signal pattern detector. 4,053,944, Cl. 364-200.000.

Dixon, Vernon Gerald Ralph, to Paclene Company Limited. Machine for perforating high density poly-ethylene film or the like film material. 4,052,920, Cl. 83-337.000.

Dobrescu, Lucia; and Huygelen, Constant, to Recherche et Industrie Therapeutiques. Pre-farrowing pregnant sow piglet colibacillosis vaccines and process for their administration to pregnant sows before farrowing. 4,053,584, Cl. 424-92.000.
Doctor Andreu S.A.: *See—*
Hosta Pujol, Alfonso; and Brosa Rabassa, Salvador, 4,053,483, Cl. 260-325.00R.
Dr. Eduard Fresenius Chemisch-Pharmazeutische Industrie KG.: *See—*
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Dr. Madaus & Co.: *See—*
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Doddi, Namassivaya; Versfelt, Charles C.; and Wasserman, David, to Ethicon, Inc. Synthetic absorbable surgical devices of poly-dioxanone. 4,052,988, Cl. 128-335.500.
Dodgson, Roy Howard, to Smiths Industries Limited. Medico-surgical tube and adaptor. 4,052,990, Cl. 128-351.000.
Doherty, Thomas E.: *See—*
Amberg, Stephen W.; and Doherty, Thomas E., 4,053,346, Cl. 156-446.000.
Doin, Bernard J.; and Tillac, Jean-Francois, to Societe Nationale des Poudres et Explosifs. Winding device particularly useful in connection with vehicle safety belts. 4,053,119, Cl. 242-107.40R.
Dolder, Fritz: *See—*
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Domkowski, Ronald A., to Halogen Insulator & Seal Corporation. Two-piece seal. 4,053,166, Cl. 277-152.000.
Donermeyer, Donald D., to Monsanto Company. Process for improving the adhesion of hot melts to metal substrates. 4,053,682, Cl. 428-460.000.
Donnelly, Lawrence A.; Flocke, Leland C.; Himel, Victor H.; Mikals, John J.; Munier, Alfred E.; and Slote, Lawrence, to Grumman Aerospace Corporation. Method and system for waste treatment. 4,053,399, Cl. 210-44.000.
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Kerr, Edwin R.; Dorawala, Tansukhlal G.; and Reinhard, Russell R., 4,053,531, Cl. 260-672.00R.
Dorn, Conrad P.: *See—*
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Dorsett, Henry: *See—*
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Dotson, Troy R. Hydrotherapy installation. 4,052,757, Cl. 4-172.170.
Dotzer, Richard; Stoger, Klaus; and Stadter, Josef, to Siemens Aktiengesellschaft. Apparatus for electrodepositing aluminum. 4,053,383, Cl. 204-225.000.
Doub, Leonard; Kaltenbronn, James S.; and Schweiss, Dieter, to Parke, Davis & Company. Substituted-1,2-dihydra-2-oxonicotinyl-cephalosporins. 4,053,470, Cl. 544-25.000.
Dougherty, William E., Jr.; Gregor, Lawrence V.; Klein, Donald L.; Redmond, Thomas F.; and Reeber, Morton D., to International Business Machines Corporation. Device for removing low level contaminants from a liquid. 4,053,942, Cl. 361-385.000.
Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V.: *See—*
Stoffelsma, Jan; and Pypker, Jacob, 4,053,656, Cl. 426-535.000.
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Goralski, Christian T.; and Klingler, Thomas C., 4,053,633, Cl. 424-337.000.
Strycker, Stanley J., 4,053,611, Cl. 424-274.000.
Towsley, Frank E., 4,053,371, Cl. 204-20.000.
Doyle, Richard C.; and Meehan, James E., to Slater Electric Inc. Electrical connector means. 4,053,198, Cl. 339-103.00R.
Drake, Charles A., to Phillips Petroleum Company. Catalytic hydrogenation of unsaturated dinitriles employing high purity alumina. 4,053,515, Cl. 260-583.00P.
Drapkin, Paul E., to TRW Inc. Stuffing channel unit for telephone PCM system. 4,053,715, Cl. 179-15.0AF.
Drehman, Lewis E.; Farha, Floyd, Jr.; and Moffat, Arlo J., to Phillips Petroleum Company. Oxidation of acetylenic impurities with copper manganite catalyst. 4,053,533, Cl. 260-681.50R.
Drouin, Andre H.: *See—*
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Droz, Willy: *See—*
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Du Pont of Canada Ltd.: *See—*
Boocock, John Roger; and Oughton, Richard Walton, 4,053,492, Cl. 260-412.400.
Dudek, Ronald P.: *See—*
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Duffy, James J.: *See—*
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Dumas, Guy H. Master-slave control method and device for a multiphase circuit. 4,053,945, Cl. 363-129.000.
Dumbaugh, George D., to Vibranetics, Inc. Mechanical work generating means. 4,052,849, Cl. 60-325.000.
Dunaway, Louis R., to Century Electric Motor Co. Submersible electric motor and electrical connector assembly. 4,053,196, Cl. 339-94.00R.
Duncan, John D., to Dana Corporation. Method of making a transformer assembly. 4,052,785, Cl. 29-605.000.
Dunkin, Albert. Rivet making method. 4,052,763, Cl. 10-27.00R.
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Adams, John Benjamin, Jr.; Ellis, Richard Lee; and Lin, Kang, 4,053,299, Cl. 71-93.000.
Baude, Frederic John; and Cupery, Willis Eli, 4,053,612, Cl. 424-286.000.
Bellina, Russell Frank; and Fost, Dennis Lynn, 4,053,634, Cl. 424-312.000.
Fan, Roxy N., 4,053,313, Cl. 96-36.000.
Riewald, Paul Gordon; Krueger, William Henry; and Dhingra, Ashok Kumar, 4,053,011, Cl. 164-97.000.
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Schindel, Wesley Gerald, 4,053,530, Cl. 260-653.800.
Simmons, Walter John; and Willis, Frank Marsden, 4,052,939, Cl. 102-24.00R.
du Pre, Frits K.; and Jaspers, Hendrik A., to North American Philips Corporation. Heat transfer interface between a high temperature heat source and a heat sink. 4,052,854, Cl. 60-524.000.
Dupuis, Jean-Michel; and Lasserre, Pierre, to Compagnie Europeenne d'Accumulateurs S.A. Method and device for checking a storage battery. 4,053,824, Cl. 324-29.500.
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Pharmacologically active thiourea and urea compounds. 4,053,473, Cl. 260-250.0BN.
Duret, Maurice Louis; and Barnoin, Pierre, to Societe Nationale Industrielle Aerospatiale. Helicopter cabin and method of making same. 4,053,126, Cl. 244-119.000.
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Ondetti, Miguel Angel; and Cushman, David W., 4,053,651, Cl. 424-319.000.
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Treuner, Uwe D.; and Breuer, Hermann, 4,053,474, Cl. 260-256.50R.
Earp, Charles W., to International Standard Electric Corporation. System for enabling coherent signal processing at a remote receiving station. 4,053,892, Cl. 343-106.00R.
Eastman Kodak Company: *See—*
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Ebinuma, Akira: *See—*
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Ebner, Walter B.; and Walk, Charles Richard, to United States of America, Army. Process for purifying lithium hexafluoroarsenate. 4,053,571, Cl. 423-464.000.
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Ecodyne Corporation: *See*—
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Edgington, Geoffrey, to Lucas Industries Limited. Apparatus for indicating rate of ice accretion. 4,053,127, Cl. 244-134.00F.
Edlin, William Joel Reginald. Suspension and heading stiffener for curtains, drapes or the like. 4,053,009, Cl. 160-348.000.
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Edwards, Colin Raymond, to Texas Instruments Incorporated. Semiconductor logic gates. 4,053,794, Cl. 307-216.000.
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Effland, Richard C.; Davis, Larry; and Schaub, Wolfgang, to American Hoechst Corporation. Piperazionalkylpyrrolobenzoxazalkanes. 4,053,599, Cl. 424-250.000.
Egami, Takeshi; and Flanders, Philip J., to University of Pennsylvania. Enhancing magnetic properties of amorphous alloys by rolling. 4,053,332, Cl. 148-120.000.
Egami, Takeshi; and Flanders, Philip J., to University of Pennsylvania. Enhancing magnetic properties of amorphous alloys by annealing under stress. 4,053,333, Cl. 148-120.000.
Egami, Takeshi: *See*—
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Breiter, Manfred Wolfgang, 4,053,689, Cl. 429-102.000.
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Goodridge, William C., 4,053,661, Cl. 427-185.000.
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Ellen, Peter Edington. Method of erecting a roof structure. 4,052,834, Cl. 52-741.000.
Elling, Homer R., to Elling, Homer R. Method of making yeast food products. 4,053,641, Cl. 426-19.000.
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Ellis, Richard Lee: *See*—
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Ellison, C. Mack, to Hydril Company. Blowout preventer ram lock and locking method. 4,052,995, Cl. 137-1.000.
Ellwood, Henry, to USM Corporation. Delta rotor through feed mixer. 4,053,144, Cl. 366-97.000.
Elrick, Donald K., to United States of America, Navy. Coating composition and method for improving propellant tear strength. 4,052,943, Cl. 102-103.000.
Elwood, William Herbert, Jr.: *See*—
Hill, Brian; and Elwood, William Herbert, Jr., 4,053,578, Cl. 423-592.000.
Ely, Cyril Harold Arthur; Lambeth, Peter John; and Looms, John Sidney Thomas, to Central Electricity Generating Board. Method and apparatus for high voltage insulation. 4,053,707, Cl. 174-209.000.
Eminger, Robert J., to Windamatic Systems, Inc. Apparatus and method for producing distributed stator windings. 4,053,111, Cl. 242-1.10R.
Emmett, John Colin: *See*—
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Thorne, David Edward; and Engel, Kurt, 4,053,607, Cl. 424-263.000.
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Haden, Walter L., Jr.; and Isaac, Peter A. H., 4,053,324, Cl. 106-288.00B.
Enomoto, Osamu, to Nippon Electric Company, Ltd. Switching network with a crosstalk elimination capability. 4,053,716, Cl. 179-18.0GF.
Enstrom, Ronald E., to United States of America, Army. Step graded photocathode. 4,053,920, Cl. 357-30.000.
Entreprise de Recherches et d'Activites Petrolieres (E.R.A.P.): *See*—
Mercier, Georges, 4,053,022, Cl. 175-5.000.
Environmental Engineering Dr. Ing. Alterman Ltd.: *See*—
Alterman, Israel, 4,052,860, Cl. 61-45.00B.
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Carter, Melvin Keith, 4,053,281, Cl. 23-230.0PC.
Erickson, John R.: *See*—
Barwise, Robert D.; Arola, Rodger A.; and Erickson, John R., 4,053,004, Cl. 144-162.00R.
Erickson, Roy D.; Johnson, Leonard A.; and Porwit, Edward I., to Minnesota Mining and Manufacturing Company. Dielectric stress relief at a high voltage cable termination. 4,053,702, Cl. 174-73.00R.
Erlich, Ricky M.: *See*—
Healey, William E.; Heineman, Morse R.; Erlich, Ricky M.; and Remaley, James H., 4,053,001, Cl. 141-2.000.
Ernst, Wolfram; Rohrig, Josef; and Renz, Gerhard, to Siemens Aktiengesellschaft. Modular logic circuit for performing different logic functions. 4,053,793, Cl. 307-207.000.
Ernsthausen, Roger E., to Owens-Illinois, Inc. Gas dielectric overcoat for panel. 4,053,803, Cl. 313-201.000.
Essers, Jakob: *See*—
Poersch, Werner; Wischniewski, Martin; and Essers, Jakob, 4,053,364, Cl. 201-13.000.
Estes, Michael J., to RTE Corporation. Temperature sensing transformer primary switch. 4,053,938, Cl. 361-37.000.
Ethicon, Inc.: *See*—
Doddi, Namassivaya; Versfelt, Charles C.; and Wasserman, David, 4,052,988, Cl. 128-335.500.
Eugenio, Amado. Electro-therapy apparatus. 4,052,978, Cl. 128-2.10Z.
Eustis, Frederic A., III; Gorman, William G.; and Nachod, Frederick C., to Sterling Drug Inc. Dichlorocyclopropylphenyl bisbiguanide compounds, processes and compositions. 4,053,636, Cl. 424-326.000.
Evers, Robert C., to United States of America, Air Force. Perfluoroalkylene ether-imidate and -thioimidate esters. 4,053,498, Cl. 260-453.0RW.
Evers, William J.; Heinsohn, Howard H., Jr.; and Vock, Manfred Hugo, to International Flavors & Fragrances Inc. Uses of α-oxy(oxo) sulfides and ethers in foodstuffs and flavors for foodstuffs. 4,053,654, Cl. 426-535.000.
Evers, William J.; Heinsohn, Howard H., Jr.; and Vock, Manfred Hugo, to International Flavors & Fragrances Inc. Uses of α-oxy(oxo) sulfides and ethers in foodstuffs and flavors for foodstuffs. 4,053,655, Cl. 426-535.000.
Excelermatic, Inc.: *See*—
Kraus, Charles E., 4,052,915, Cl. 74-798.000.
Exotech, Incorporated: *See*—
Schalkowsky, Samuel; and Clipp, Louis L., 4,053,110, Cl. 241-1.000.
Exxon Research & Engineering Co.: *See*—
Argurio, Federico; Borsatti, Mario; and Heindrijckx, Jan, 4,053,540, Cl. 260-897.00B.
Cull, Neville L.; and Eberly, Paul E., Jr., 4,053,574, Cl. 423-573.00G.
Lundberg, Robert D.; and Makowski, Henry S., 4,053,548, Cl. 264-230.000.
Oswald, Alexis A., 4,053,493, Cl. 260-448.00C.
Trense, Ronald V.; Clamen, Allen; and Fernbacher, John M., 4,053,396, Cl. 210-17.000.
Fa. Wilhelm Fette GmbH: *See*—
Friedrichs, Konrad; Hinzpeter, Jurgen; and Brauner, Walter, 4,053,266, Cl. 425-73.000.
Fairchild Camera and Instrument Corporation: *See*—
Hose, R. Kenneth, Jr.; Riordan, Keith; and Martin, Stephen M., 4,053,821, Cl. 363-60.000.
Fan, Roxy N., to Du Pont de Nemours, E. I., and Company. Process for image reproduction using multilayer photosensitive solvent processable elements. 4,053,313, Cl. 96-36.000.
Fanta, Wayne I., to Procter & Gamble Company, The. Insecticidal method utilizing certain coumaranol esters of cyclopropane carboxylic acids. 4,053,629, Cl. 424-285.000.
Farge, Daniel; LeGoff, Yves; and Poiget, Gilbert, to Philagro. Agricultural composition incorporating derivatives of 7H-indolizino (7,6,5-de)-isoquinoline. 4,053,300, Cl. 71-94.000.
Farha, Floyd, Jr.: *See*—
Drehman, Lewis E.; Farha, Floyd, Jr.; and Moffat, Arlo J., 4,053,533, Cl. 260-681.50R.
Farmer, John Edgar. Battery strap mold and anti-drip pouring means. 4,053,012, Cl. 164-254.000.
Farney, George Kenneth; and Gerard, William Allen, to Varian Associates, Inc. Magnetron slot mode absorber. 4,053,850, Cl. 331-91.000.
Faro, Hans-Peter; and Symchowicz, Samson, to Schering Corporation. Substituted aryl and aralkyl amides. 4,053,509, Cl. 260-557.00R.
Farr, Alton E. Rowing device for a forward facing rower. 4,052,951, Cl. 115-24.100.
Fattinger, Volker: *See*—
Schneider, Jurg; and Fattinger, Volker, 4,053,292, Cl. 55-227.000.
Faunce, John Ray. Locking security frame. 4,052,867, Cl. 70-58.000.
Faure, Louis Henry: *See*—
Coughlin, Charles Paul; and Faure, Louis Henry, 4,052,793, Cl. 33-180.00R.
Fay, Clifford Charles, to Standard Oil Company (Indiana). Process for manufacturing laminated structural foam articles. 4,053,545, Cl. 264-46.400.

Feddern, Horst: *See—*
Moser, Robert; Steinegger, Alfred; Dolder, Fritz; and Feddern, Horst, 4,053,147, Cl. 266-220.000.

Federal-Mogul Corporation: *See—*
Beauvais, Albert L., 4,053,049, Cl. 206-318.000.

Federal Pacific Electric Company: *See—*
Sircom, Richard C., 4,053,815, Cl. 361-42.000.

Feit, Louis: *See—*
Kivi, Aare; and Feit, Louis, 4,053,855, Cl. 333-73.00W.

Feldstein, George, to Incom International Inc. Cable core conduit. 4,052,911, Cl. 74-501.00R.

Felice, Patrick E., to Westinghouse Electric Corporation. Locating underground uranium deposits. 4,053,772, Cl. 250-337.000.

Fellrath, Jean, to Centre Electronique Horloger S.A. Device for transmission of information by pulse code frequency shift modulation. 4,053,836, Cl. 325-320.000.

Feneberg, Paul, to AGFA-Gevaert AG. Process for making a die punch. 4,052,916, Cl. 76-107.00R.

Ferg S.L.: *See—*
Garcia, Jose Fernandez, 4,052,823, Cl. 51-95.0TG.

Fernbacher, John M.: *See—*
Trense, Ronald V.; Clamen, Allen; and Fernbacher, John M., 4,053,396, Cl. 210-17.000.

Ferranti Limited: *See—*
Grundy, David Latham; and Hughes, Kenneth Lawson, 4,053,336, Cl. 148-175.000.

Ferrero, Oscar Adolfo; and Lodi, Jorge Lorenzo, to Coca-Cola Company, The. Machine for filling containers. 4,053,003, Cl. 141-144.000.

Ferro, Armand P., to General Electric Company. Light triggered thyristor having controlled turn on delay. 4,053,922, Cl. 357-38.000.

Fewster, Sidney: *See—*
Peters, Kenneth; Fewster, Sidney; Wilson, Frank; and Kearney, Kevin David Nicolas, 4,053,695, Cl. 429-225.000.

Fiberlok, Inc.: *See—*
Buck, George Sumner, Jr.; Weyker, Robert George; and Ward, Arthur Gerard, 4,053,673, Cl. 428-283.000.
Buck, George Sumner, Jr.; Weyker, Robert George; and Ward, Arthur Gerard, 4,053,674, Cl. 428-283.000.

Filaine, Roger: *See—*
Degeye, Guy; and Filaine, Roger, 4,052,870, Cl. 70-364.00R.

Fischer, Edgar; Mauz, Otto; Mayer, Norbert; and Pfahler, Gerhard, to Hoechst Aktiengesellschaft. Acetoacetic acid pentaerythrite phosphite ester. 4,053,541, Cl. 260-937.000.

Fischer, Hanspeter: *See—*
Fory, Werner; Fischer, Hanspeter; Lohmann, Dieter; and Greber, Gerd, 4,053,496, Cl. 260-448.80R.
Fory, Werner; Fischer, Hanspeter; Lohmann, Dieter; and Greber, Gerd, 4,053,497, Cl. 260-448.80R.

Fischer & Porter Co.: *See—*
Herzl, Peter J.; and Strohmeier, Warren, 4,052,895, Cl. 73-194.0VS.

Fisher, Charles B.: *See—*
Fisher, Sidney T.; and Fisher, Charles B., 4,053,856, Cl. 333-82.00R.

Fisher, Mahlon B.: *See—*
Williams, G. Norman; and Fisher, Mahlon B., 4,053,904, Cl. 354-1.000.

Fisher, Sidney T.; and Fisher, Charles B. Quasi-toroidal inductor and resonator. 4,053,856, Cl. 333-82.00R.

Fisk, Pliny. Process for separating and converting waste into useable products. 4,053,394, Cl. 210-8.000.

Fisons Limited: *See—*
Stevenson, Neil Arthur; and Wardell, George, 4,053,628, Cl. 424-283.000.

Fitzpatrick, Michael D.: *See—*
Cricchi, James R.; and Fitzpatrick, Michael D., 4,053,916, Cl. 357-23.000.

Flanders, Philip J.: *See—*
Egami, Takeshi; and Flanders, Philip J., 4,053,332, Cl. 148-120.000.
Egami, Takeshi; and Flanders, Philip J., 4,053,333, Cl. 148-120.000.
Graham, Charles D., Jr.; Flanders, Philip J.; and Egami, Takeshi, 4,053,331, Cl. 148-120.000.

Flatau, Abraham, to United States of America, Army. Autorotor launching system. 4,052,927, Cl. 89-1.50R.

Fleckenstein, Lee J., to Eastman Kodak Company. O-sulfonamidonaphthol diffusible dye image providing compounds. 4,053,312, Cl. 96-3.000.

Fleischmann, Werner; Reinkenobbe, Heinz-Otto; and Schmidt, Manfred, to "Keramag" Keramische Werke AG; and Adolf A. Fleischmann, Firma. Tunnel kiln. 4,053,278, Cl. 432-137.000.

Fletcher, Edward A., to University of Minnesota, The Regents of the. System for obtaining hydrogen and oxygen from water using solar energy. 4,053,576, Cl. 423-579.000.

Flocke, Leland C.: *See—*
Donnelly, Lawrence A.; Flocke, Leland C.; Himel, Victor H.; Mikals, John J.; Munier, Alfred E.; and Slote, Lawrence, 4,053,399, Cl. 210-44.000.

Flynn, George C., to Ecodyne Corporation. Method of recovering backwash liquid with exhausted resin. 4,053,397, Cl. 210-34.000.

FMC Corporation: *See—*
Jensen, Lyle B.; and Powers, C. Wayne, 4,053,058, Cl. 212-8.00R.
Pentz, Howard; Weed, R. Henry; and Lodholz, John C., 4,053,421, Cl. 210-528.000.

Foerstner, Richard A., to Amana Refrigeration, Inc. Microwave energy oven seal. 4,053,731, Cl. 219-10.55D.

Forbes, Hampton E., Jr.; and Nock, John M., to Westvaco Corporation. Display package. 4,053,050, Cl. 206-361.000.

Ford Motor Company: *See—*
Smartt, Herschel B.; and Kovacs, Bela V., 4,053,146, Cl. 266-216.000.

Formica, Joseph V.: *See—*
Apple, Martin A.; and Formica, Joseph V., 4,053,460, Cl. 260-112.50R.

Forrat, Francis, to Commissariat a l'Energie Atomique. Photovoltaic cell. 4,053,326, Cl. 136-89.0CC.

Fortune, John Cook: *See—*
Brown, Thomas Graham; Skrgatic, Damir Josip Miroslav; Younger, Graeme William; and Fortune, John Cook, 4,052,888, Cl. 73-67.80S.

Fory, Werner; Fischer, Hanspeter; Lohmann, Dieter; and Greber, Gerd, to Ciba-Geigy Corporation. Products from the hydrolysis of β-halogenoethyl-silanes and their use as agents for the regulation of plant growth. 4,053,496, Cl. 260-448.80R.

Fory, Werner; Fischer, Hanspeter; Lohmann, Dieter; and Greber, Gerd, to Ciba-Geigy Corporation. Agent for the regulation of plant growth. 4,053,497, Cl. 260-448.80R.

Fost, Dennis Lynn: *See—*
Bellina, Russell Frank; and Fost, Dennis Lynn, 4,053,634, Cl. 424-312.000.

Foudos, James N. Assured-check computer-based bank credit disbursing system. 4,053,735, Cl. 235-61.90R.

Foulks, Noah E.: *See—*
Cullinan, Robert L.; Jay, Ronald W.; Beck, Keith; and Miller, Lloyd J., 4,052,880, Cl. 72-326.000.

Fournier, Jacques Pierre D.: *See—*
Courvoisier, Jean-Claude F.; Meylan, Jean-Luc Ch.; Gross, Daniel M.; and Fournier, Jacques Pierre D., 4,053,368, Cl. 203-10.000.

Foust, Tilman H., Jr., to AMP Incorporated. Read and write circuitry. 4,053,936, Cl. 360-62.000.

Fowler, John H.: *See—*
Herd, David P.; Fowler, John H.; Drouin, Andre H.; and Bush, Robert E., 4,053,023, Cl. 175-7.000.

Fox, John Francis; Roylance, Thomas William; and Mair, Angus Campbell, to Arbrook, Inc. Starch derivatives. 4,053,379, Cl. 204-160.100.

Franchin, Franco, to Officine Franchin di Giuliano Franchin & C. S.a.s. Level lifting system for truck bodies or containers. 4,053,073, Cl. 214-515.000.

Francis, James R. Paint can holder. 4,053,131, Cl. 248-211.000.

Franke, Kurt, to Siemens Aktiengesellschaft. Transportable X-ray diagnostic apparatus. 4,053,778, Cl. 250-402.000.

Franklin, John C.; and Meyer, Thomas O., to United States of America, Interior. Constant flow radon gas monitor. 4,053,775, Cl. 250-364.000.

Frantzreb, John G., Sr., to Caterpillar Tractor Co. Wire reel. 4,053,120, Cl. 242-115.000.

Franz, Gerhard, to Allied Chemical Corporation. Aluminum and magnesium perchlorate-hydrazine complexes. 4,053,567, Cl. 423-386.000.

Fratzke, Lawrence F.: *See—*
Cox, Harrison F.; Cochran, Thomas E.; Fratzke, Lawrence F.; and Fuzzell, Joe E., 4,053,868, Cl. 340-52.00F.

Freeman, Leo Boyes; Incerto, Robert James; and Petrosky, Joseph Anthony, Jr., to International Business Machines Corporation. Self-isolating cross-coupled sense amplifier latch circuit. 4,053,873, Cl. 340-173.00R.

Frey, Volker: *See—*
Deinhammer, Wolfgang; Frey, Volker; Wick, Manfred; and Riedle, Rudolf, 4,053,495, Cl. 260-448.20E.

Frezza, Robert, to Samcoe Holding Corporation. High speed fabric folder. 4,053,151, Cl. 270-79.000.

Fridrich, Elmer G.; and Bergman, Rolf S., to General Electric Company. Short-arc discharge lamp with starting device. 4,053,809, Cl. 313-198.000.

Friedrichs, Konrad; Hinzpeter, Jurgen; and Brauner, Walter, to Fa. Wilhelm Fette GmbH. Protective hood for pelleting presses. 4,053,266, Cl. 425-73.000.

Frielinghaus, Klaus H.; and Wilcox, Clinton S., to General Signal Corporation. Jointless high frequency track circuit systems for railroads. 4,053,128, Cl. 246-34.00R.

Frito-Lay, Inc.: *See—*
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Frohberger, Paul-Ernst: *See—*
Buchel, Karl Heinz; Kramer, Wolfgang; Brandes, Wilhelm; and Frohberger, Paul-Ernst, 4,053,616, Cl. 424-269.000.
Daum, Werner; and Frohberger, Paul-Ernst, 4,053,598, Cl. 424-248.560.
Enders, Edgar; and Frohberger, Paul-Ernst, 4,053,620, Cl. 424-273.00R.

Frumoff, Lew. Medical product combining antimicrobial, antiporasitic and vitamin complex. 4,053,593, Cl. 424-181.000.

Fuhrboter, Alfred; and Mittelstadt, Manfred, to Salzgitter AG. System for gathering solids from the ocean floor and bringing them to the surface. 4,052,800, Cl. 37-58.000.

Fuji Jukogyo Kabushiki Kaisha: *See—*
Mizunuma, Tokuichi; Yamazoe, Hisamitsu; and Matsuno, Isao, 4,052,972, Cl. 123-191.00R.

Fuji Photo Film Co., Ltd.: *See—*
Kato, Hisatoyo; and Miyahara, Junji, 4,053,208, Cl. 350-117.000.
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, 4,053,318, Cl. 96-139.000.
Satomura, Masato, 4,053,415, Cl. 204-159.190.

Fujiki, Norio; and Endo, Hiroshi, to Nissan Motor Co., Ltd. Logic circuit for an automatic braking system for a motor vehicle. 4,053,026, Cl. 180-98.000.

Fujita, Yasuhiko: *See—*
Hiramatsu, Takeo; and Fujita, Yasuhiko, 4,052,930, Cl. 91-446.000.

Fujita, Yoshiji; Omura, Yoshiaki; Mori, Fumio; Itoi, Kazuo; Nishida, Takashi; Tamai, Yoshin; Aihara, Sukeji; Hosogai, Takeo; and Wada, Fumio, to Kurraray Co., Ltd. 1,1,1-Trihalogeno-4-methylpentenes, method of preparing the same and use of the same in the preparation of 1,1-dihalogeno-4-methyl-1,3-pentadienes. 4,053,380, Cl. 204-163.00R.

Fujitsu Ten Limited: *See—*
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Fukushima, Fumiaki; Sugita, Tasuku; Kobayashi, Kohei; Asada, Hiroshi; and Onishi, Arata, to Nichireki Chemical Inudstry Co., Ltd. Sludge treating process. 4,053,401, Cl. 210-52.000.

Furukawa, Masamichi; and Iguchi, Susumu, to Ricoh Co., Ltd. Waveform analysis system. 4,053,831, Cl. 324-77.00A.

Fuzzell, Joe E.: *See—*
Cox, Harrison F.; Cochran, Thomas E.; Fratzke, Lawrence F.; and Fuzzell, Joe E., 4,053,868, Cl. 340-52.00F.

G. D. Searle & Co.: *See—*
Chien, Yie W.; and Lambert, Howard J., 4,053,580, Cl. 424-15.000.
Chorvat, Robert J.; and Pappo, Raphael, 4,053,476, Cl. 260-289.00D.
Hill, John B., 4,053,481, Cl. 260-307.00A.
Yen, Chung H., 4,053,477, Cl. 260-293.670.

Gabler, Otto Leonhard: *See—*
Crain, Philip Warren; Gabler, Otto Leonhard; and Kilroy, Eugene Joseph, Jr., 4,052,813, Cl. 46-119.000.

Galvin, Lee Robert, to Motorola Inc. Technique for damping electronic module printed wiring board. 4,053,943, Cl. 361-399.000.

Gamadia, Rustom Kooverji, to Lever Brothers Company. Pump for dispensing liquids. 4,053,089, Cl. 222-321.000.

Ganderton, William, to Tioxide Group Limited. Transducers. 4,052,900, Cl. 73-313.000.

Gandini, Mario, to Durst AG. Fabrik Fototechnischer Apparate Bozen. Illuminating apparatus for photographic color enlarger. 4,053,222, Cl. 355-71.000.

Ganellin, Charon Robin: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin,-Charon Robin, 4,053,473, Cl. 260-250.0BN.

Ganiaris, Neophytos, to Struthers Scientific and International Corporation. Fluidized bed process. 4,052,794, Cl. 34-10.000.

Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., to Control Drug Inc. Method of treating nutritional deficiency during cardiac cachexia, diabetes, hypoglycemia, gastroenteralogy, lipid, cell glycogen and keratin-related skin conditions and alcoholism. 4,053,589, Cl. 424-177.000.

Gar, Konrad. Flapping wing aircraft. 4,053,122, Cl. 244-11.000.

Garber, Albert M.: *See—*
Schultz, Frederick E.; and Garber, Albert M., 4,052,913, Cl. 74-572.000.

Garcia, Jose Fernandez, to Ferg S.L. Tap transport device. 4,052,823, Cl. 51-95.0TG.

Gardner, Phillip J.: *See—*
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Garlapaty, Venkat R.: *See—*
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Garlock Inc.: *See—*
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Garloff, Randall: *See—*
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Garner, Albert Y., to Monsanto Research Corporation. Flame retardant. 4,053,560, Cl. 423-302.000.

Garrett, Frederick L., Jr.; Garrett, Frederick L., III; and Birkett, Gordon M. Apparatus for planting seed oysters. 4,052,961, Cl. 119-4.000.

Garrett, Frederick L., III: *See—*
Garrett, Frederick L., Jr.; Garrett, Frederick L., III; and Birkett, Gordon M., 4,052,961, Cl. 119-4.000.

Garwacki, Walter: *See—*
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Gastebois, Philippe Marc Denis: *See—*
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Gates Rubber Company, The: *See—*
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Gattuso, Marion J.: *See—*
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Gaudish, Paul, to International Paper Company. Hermetically sealed carton. 4,053,103, Cl. 229-37.00R.

Gausepohl, Hermann: *See—*
Herrle, Karl; Gausepohl, Hermann; and Schwarz, Wolfgang, 4,053,696, Cl. 526-65.000.

Gavagan, James A.; and Petersen, Carl Mogens, III, to Irvin Industries, Inc. Safety seat belt buckle. 4,052,775, Cl. 24-230.00A.

GEBA, Gesellschaft fuer elektronische Brandmeldeanlagen mbH & Co.: *See—*
Berger, Heinz Otto; and Munstedt, Wolfgang, 4,053,777, Cl. 250-380.000.

Gebauer, Peter; and Unrath, Peter, to Dynamit Nobel Aktiengesellschaft. Adherent powder coatings on a basis of PVC copolymers. 4,053,659, Cl. 427-27.000.

Gee, Beryl, to Gee, Beryl. Jar and bottle cap opener. 4,052,917, Cl. 81-3.420.

Geiger, Rolf: *See—*
Konig, Wolfgang; Geiger, Rolf; Wissmann, Hans; Kruse, Hansjorg; and Peterfalvi, Michel, 4,053,588, Cl. 424-177.000.

GEL, Inc.: *See—*
Zito, Ralph, Jr.; and Kunz, Lawrence J., Jr., 4,053,684, Cl. 429-15.000.

Gelenkwellenbau GmbH: *See—*
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Gellert, Jobst Ulrich. Valve-gated injection molding mechanism. 4,053,271, Cl. 425-562.000.

General Battery Corporation: *See—*
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General Dynamics Corporation: *See—*
Kuffer, Fernand Bannie, 4,053,765, Cl. 250-227.000.

General Electric Company: *See—*
Blount, Richard, 4,053,757, Cl. 362-4.000.
Ehle, Roger S.; and Garwacki, Walter, 4,053,334, Cl. 148-171.000.
Ferro, Armand P., 4,053,922, Cl. 357-38.000.
Fridrich, Elmer G.; and Bergman, Rolf S., 4,053,809, Cl. 313-198.000.
Grass, Joseph J., 4,053,782, Cl. 250-491.000.
Kornrumpf, William P.; and Jahns, Thomas M., 4,053,813, Cl. 315-206.000.
Ness, Phillip D.; and Long, Robert A., 4,053,249, Cl. 408-1.0BD.
Schultz, Frederick E.; and Garber, Albert M., 4,052,913, Cl. 74-572.000.
Talento, Joseph L.; and Popadick, Carl C., 4,053,728, Cl. 200-267.000.
Young, James R., 4,053,825, Cl. 324-33.000.

General Foods Corporation: *See—*
Mahlmann, James P., 4,053,652, Cl. 426-388.000.

General Foods Limited: *See—*
Lack, Bryan Edward Charles; and Newman, Alec Thomas, 4,053,087, Cl. 222-278.000.

General Mills Chemicals Co.: *See—*
Clitheroe, Jay B.; and Sudderth, Robert Brantley, 4,053,552, Cl. 423-100.000.

General Mills Chemicals, Inc.: *See—*
Cahalan, Patrick Thomas; Peterson, John Allen; and Arndt, Douglas Arthur, 4,053,699, Cl. 536-114.000.

General Motors Corporation: *See—*
Colling, Ronald L.; Trenne, Myron U.; and Schlax, Timothy R., 4,052,967, Cl. 123-117.00D.

General Signal Corporation: *See—*
Anderson, Robert, 4,053,879, Cl. 340-351.000.
Frielinghaus, Klaus H.; and Wilcox, Clinton S., 4,053,128, Cl. 246-34.00R.
Lee, Sung Chuel; Podany, Vaclav Oldrich; and Costa, Hilario Simoes, 4,053,785, Cl. 250-574.000.

Genini, Graziano, to Albatex A.G. Mechanism for controlling the motion of the weft carrying grippers in looms. 4,052,906, Cl. 74-57.000.

Gentile, Vincenzo: *See—*
Mancini, Robert; and Gentile, Vincenzo, 4,052,828, Cl. 52-242.000.

George, James Rembrandt, to Vango Media, Inc. Display device with adjustable attachment means. 4,052,806, Cl. 40-129.00C.

George, John A.: *See—*
Pradhan, Ashok V.; and George, John A., 4,053,357, Cl. 176-37.000.

George, Lyndell J. C.; and Shelly, Robert S., to A G L Corporation. Self-leveling construction alignment laser. 4,053,238, Cl. 356-249.000.

Gerard, William Allen: *See—*
Farney, George Kenneth; and Gerard, William Allen, 4,053,850, Cl. 331-91.000.

Gersch, Richard C. Cutting tool holder. 4,053,252, Cl. 408-150.000.

Gersh, Michael Elliot: *See—*
Bien, Fritz; Camac, Morton; and Gersh, Michael Elliot, 4,053,233, Cl. 356-141.000.

Gerstenmaier, John H.: *See—*
Appleby, Paul E.; Christie, Christopher E.; Gerstenmaier, John H.; Minter, Thomas F.; and Woodhall, Edwin S., 4,053,342, Cl. 156-123.00R.

Gertner, Edward R.: *See—*
Andrews, Austin M., II; Clarke, John E.; Longo, Joseph T.; and Gertner, Edward R., 4,053,919, Cl. 357-30.000.

Gewartowski, Steve A., to UOP Inc. Temperature control of integrated fractionation and claytreating of hydrocarbons. 4,053,367, Cl. 203-2.000.

GF Business Equipment, Inc.: *See—*
Ogilvie, LeRoy F.; and Hartig, Henry F., 4,053,701, Cl. 174-48.000.

Gibson, Donald B.: *See—*
Story, Charles F.; and Gibson, Donald B., 4,053,339, Cl. 156-62.200.

Gidick, Ward Francis, to Koppers Company, Inc. Apparatus for transferring hot coke into a coke quenching car. 4,053,068, Cl. 214-18.00R.

Gilead, Gideon. Water conducting and emitting device. 4,053,109, Cl. 239-542.000.

Gill, Raymond E.; and McMahon, Floyd, to Westinghouse Air Brake Company. Cross slope contact system for surface finishing machines. 4,053,017, Cl. 172-4.500.

Gilman, Lester, to Kidde Consumer Durables Corporation. Electrical junction assembly. 4,053,194, Cl. 339-21.00R.

Giongo, Matteo; Marconi, Walter; Palladino, Nicola; and Di Gregorio,

Francesco, to Snam Progetti S.p.A. Asymmetrical hydrogenation by means of optically active aluminum hydride derivatives. 4,053,521, Cl. 260-618.00H.
Gits, Gerald B.; and Deverich, Daniel L., to Apollo of the Ozarks, Inc. Method and article of manufacture of a pyrotechnic device. 4,052,940, Cl. 102-33.000.
Gits, Jacqueline; and Zygraich, Nathan, to SmithKline Corporation. Live Newcastle disease virus vaccines. 4,053,583, Cl. 424-90.000.
Glaser, Helmut, to Siemens Aktiengesellschaft. Apparatus for monitoring the liquid level in a tank. 4,053,874, Cl. 340-244.00R.
Glaser, Milton A.: *See—*
Vogel, Richard W.; Suciu, Nick N., IV; Glaser, Milton A.; and Szwedo, John A., 4,053,076, Cl. 215-12.00R.
Glazier, Charles A. Warning light guard. 4,053,760, Cl. 362-186.000.
Glenn, Richard C., to United States Steel Corporation. Method for forming an internal taper in the walls of a sleeve-like body. 4,053,347, Cl. 156-637.000.
Globe-Union Inc.: *See—*
Roy, Kenneth Lee, 4,052,954, Cl. 116-124.00L.
Glover, Clyde Pershing: *See—*
Hamblen, David Philip; Glover, Clyde Pershing; and Kim, Sang Hyung, 4,053,381, Cl. 204-195.00M.
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Gnida, Bernd: *See—*
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Gockel, Jack L., to Air Quality Products, Inc. Process for the control of oxides of nitrogen from internal combustion engines. 4,052,966, Cl. 123-117.00A.
Goderbauer, Lodewijk. Device for fastening a rail to a sleeper, holder and clip for the application of such a fastening device. 4,053,107, Cl. 238-349.000.
Goertz, Arnold Elmer: *See—*
Schrag, Thomas Gene; Burkhart, Merle Keith; and Goertz, Arnold Elmer, 4,053,071, Cl. 214-506.000.
Golborn, Peter; and Duffy, James J., to Hooker Chemicals & Plastics Corporation. Dialkyl alkyl and cyclic phosphoramidomethyl phosphonates. 4,053,450, Cl. 260-45.80R.
Golembeck, Gerald A.; and Marx, Ralph J., to United States Bedding Company, The. Coil spring assembly. 4,052,760, Cl. 5-248.000.
Gonnam, Russell W.: *See—*
Hinman, Walter L., Jr.; and Gonnam, Russell W., 4,053,940, Cl. 361-68.000.
Goodridge, William C., to Electrostatic Equipment Corporation. Particle cloud coating method and apparatus. 4,053,661, Cl. 427-185.000.
Goodwin, Anthony Richard, to ITT Industries, Inc. Light emissive diode. 4,053,914, Cl. 357-17.000.
Goodyear Tire & Rubber Company, The: *See—*
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Miller, Glenn E., 4,053,520, Cl. 260-610.00A.
Taylor, Challen E., 4,053,550, Cl. 264-347.000.
Goralski, Christian T.; and Klingler, Thomas C., to Dow Chemical Company, The. Aryl dibromonitromethyl sulfones. 4,053,633, Cl. 424-337.000.
Gordon, John Edson, to American Cyanamid Company. Process for production of ammonium N^4-acetysulfanilylcyanamide. 4,053,490, Cl. 260-397.70R.
Goren, Alvin J.: *See—*
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Gorenberg, Eli M.: *See—*
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., 4,053,589, Cl. 424-177.000.
Gorini, Sergio; and Valcavi, Umberto, to Istituto Biochimico Italiano di Loredana Lorenzini S.a.s. Substituted amides of 3-methyl-4-phenyl-3-butenoic acid, with a high hypolipemizing activity. 4,053,635, Cl. 424-324.000.
Gorler, Klaus: *See—*
Madaus, Rolf Hermann Heinrich; and Gorler, Klaus, 4,053,568, Cl. 423-419.00P.
Gorman, William G.: *See—*
Eustis, Frederic A., III; Gorman, William G.; and Nachod, Frederick C., 4,053,636, Cl. 424-326.000.
Goto, Kazuo: *See—*
Hayashi, Toshio; Goto, Kazuo; and Haruyama, Osamu, 4,052,959, Cl. 118-644.000.
Gould, Gordon. Optically pumped laser amplifiers. 4,053,845, Cl. 330-4.300.
Gould, Inc.: *See—*
Knapp, Edward J., Jr., 4,053,861, Cl. 337-165.000.
Kozacka, Frederick J.; and Belcher, Richard A., 4,053,860, Cl. 337-164.000.
Goverde, Ludovicus J., to Ontario Tool Design Inc. Skate and method of producing same. 4,053,168, Cl. 280-11.120.
Graff, Vernon D. Gliding chair system. 4,053,129, Cl. 248-188.700.
Graham, Charles D., Jr.; Flanders, Philip J.; and Egami, Takeshi, to University of Pennsylvania. Method of making amorphous metallic alloys having enhanced magnetic properties by using tensile stress. 4,053,331, Cl. 148-120.000.
Graham, Donald W.; Rogers, Edward F.; and Ashton, Wallace T., to Merck & Co., Inc. Compositions for treating coccidiosis containing 5-deazariboflavin and its derivatives. 4,053,602, Cl. 424-251.000.
Grams, Guenter A.; and Grazer, Frederick M., to Grams, Guenter A. Triaxial fiberoptic soft tissue retractor. 4,052,980, Cl. 128-18.000.
Grappe, Rene Gabriel, to Societe Souriau et Cie. Electric cable connection adapted for high external pressures. 4,053,201, Cl. 339-218.00R.
Grass, Joseph J., to General Electric Company. Device for aligning an x-ray source with an image receptor. 4,053,782, Cl. 250-491.000.
Grataloup, Xavier Roger, to Nodet Gougis. Rotary dispenser with delivery regulating valve and scraper. 4,053,088, Cl. 222-312.000.
Gravel, Mark William: *See—*
Warner, John Craig; and Gravel, Mark William, 4,052,909, Cl. 74-231.00P.
Grawey, Charles E., to Caterpillar Tractor Co. Apparatus and method for forming a tube article on a core. 4,053,272, Cl. 425-302.100.
Grazer, Frederick M.: *See—*
Grams, Guenter A.; and Grazer, Frederick M., 4,052,980, Cl. 128-18.000.
Great Lakes Carbon Corporation: *See—*
Welter, Franklin H., 4,053,365, Cl. 202-100.000.
Greber, Gerd: *See—*
Fory, Werner; Fischer, Hanspeter; Lohmann, Dieter; and Greber, Gerd, 4,053,496, Cl. 260-448.80R.
Fory, Werner; Fischer, Hanspeter; Lohmann, Dieter; and Greber, Gerd, 4,053,497, Cl. 260-448.80R.
Green, Charles B., to International Paper Company. Method of making a disposable garment. 4,052,752, Cl. 2-243.00R.
Green, David: *See—*
Malmberg, Paul R.; Handy, Robert M.; Stoneburner, Donald F.; and Green, David, 4,053,833, Cl. 324-158.00R.
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Gregor, Lawrence V.: *See—*
Dougherty, William E., Jr.; Gregor, Lawrence V.; Klein, Donald L.; Redmond, Thomas F.; and Reeber, Morton D., 4,053,942, Cl. 361-385.000.
Gregoriadis, Gregory: *See—*
Allison, Anthony Clifford; and Gregoriadis, Gregory, 4,053,585, Cl. 424-92.000.
Griffith, Raymond E. Animal access door for screen doors. 4,053,007, Cl. 160-180.000.
Grimmett, Howard L.: *See—*
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Groff, Donald M.: *See—*
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Groff, Harold M., to Groff, Donald M., a part interest. Bag accessory. 4,052,764, Cl. 15-257.900.
Gross, Daniel M.: *See—*
Courvoisier, Jean-Claude F.; Meylan, Jean-Luc Ch.; Gross, Daniel M.; and Fournier, Jacques Pierre D., 4,053,368, Cl. 203-10.000.
Gross, Erwin, to Standardwerk Eugen Reis GmbH. Coin-packaging machine. 4,052,839, Cl. 53-212.000.
Grover, Richard K.; and Larsen, Robert H. Room divider and cabinet structure for dental equipment. 4,053,193, Cl. 312-209.000.
Groves, Charles L., Jr.: *See—*
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Grumman Aerospace Corporation: *See—*
Donnelly, Lawrence A.; Flocke, Leland C.; Himel, Victor H.; Mikals, John J.; Munier, Alfred E.; and Slote, Lawrence, 4,053,399, Cl. 210-44.000.
Grundy, David Latham; and Hughes, Kenneth Lawson, to Ferranti Limited. Method of manufacturing a semiconductor integrated circuit device having a conductive plane and a diffused network of conductive tracks. 4,053,336, Cl. 148-175.000.
Grygo, Gunter: *See—*
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GTE Automatic Electric Laboratories Incorporated: *See—*
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GTE Laboratories Incorporated: *See—*
Regan, Robert J.; Haugsjaa, Paul O.; and McNeill, William H., 4,053,814, Cl. 315-248.000.
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GTE Sylvania Incorporated: *See—*
Scholz, John A.; Gardner, Phillip J.; and Silver, H. Graham, 4,053,805, Cl. 313-229.000.
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Schultz, Thomas W., 4,053,906, Cl. 354-1.000.
Williams, G. Norman; and Fisher, Mahlon B., 4,053,904, Cl. 354-1.000.
Guba, Peter. Multi-purpose apparatus for heating or cooling fluids. 4,053,013, Cl. 165-86.000.
Guettler, Lawrence H., Jr. Load transferring trailer hitch device. 4,053,174, Cl. 280-406.00A.
Guhne, Wieland; and Hoffmann, Klaus, to Vorwerk & Co. Elektrowerke GmbH & Co. KG. Vacuum cleaner. 4,052,765, Cl. 15-344.000.
Gulf Research & Development Company: *See—*
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Paraskos, John Angelo; and Yanik, Stephen Joseph, 4,053,391, Cl. 208-210.000.
Guraydin, Orhan A., to International Telephone and Telegraph Corporation. Resettable electro-mechanical vacuum fuse. 4,053,857, Cl. 335-147.000.
Gussefeld, Horst, to Siemens Aktiengesellschaft. Static mixer for flowing media. 4,053,141, Cl. 366-339.000.

Gutowski, Gerald E., to Eli Lilly and Company. Acylation of pyrazofurin. 4,053,698, Cl. 536-1.000.

Gutridge, Ian P., to International Nickel Company, Inc., The. Nickel activation battery component. 4,053,694, Cl. 429-223.000.

Haas, Larry A.; and Khalafalla, Sanaa E., to United States of America, Interior. Sulfur recovery from H_2S and SO_2-containing gases. 4,053,575, Cl. 423-575.000.

Hacco, Robert: *See—*
Hamaoui, Moise N., 4,053,844, Cl. 330-2.000.

Hach Chemical Company: *See—*
Hach, Clifford C.; and Buck, Michael D., 4,053,282, Cl. 23-230.00R.

Hach, Clifford C.; and Buck, Michael D., to Hach Chemical Company. Method and apparatus for sampling impure water. 4,053,282, Cl. 23-230.00R.

Haden, Walter L., Jr.; and Isaac, Peter A. H., to Engelhard Minerals & Chemicals Corporation. Production of reduced charge montmorillonite pigment. 4,053,324, Cl. 106-288.00B.

Hagerty, Mary L. Method and apparatus for containerizing plants with a self-watering system. 4,052,818, Cl. 47-81.000.

Hahn, Hans Helmut. Upgrading coal for coking purposes. 4,053,569, Cl. 423-445.000.

Hajimoto, Yoshioki: *See—*
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Hajos, Zoltan George, to Hoffmann-La Roche Inc. Stereospecific total steroidal synthesis via substituted C/D-trans indanones. 4,053,486, Cl. 260-345.90S.

Halase, John F., III; Halsey, Homer P.; and Troup, Robert L., to Youngstown Sheet and Tube Company. Energy measuring systems adapted for use in conjunction with load moving and weight indicating devices. 4,053,742, Cl. 364-506.000.

Halberstadt, Harry J.: *See—*
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Hale, David Jerry; Mayer, William B.; and Kollman, Delhardt K., to Brunswick Corporation. Hydraulic powered trim and tile apparatus for marine propulsion devices. 4,052,952, Cl. 115-41.0HT.

Hale, William J.: *See—*
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Hall, Steve. Hoop guide rod and hoop rolling game apparatus. 4,052,814, Cl. 46-220.000.

Halliburton Company: *See—*
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Halogen Insulator & Seal Corporation: *See—*
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Halsey, Homer P.: *See—*
Halase, John F., III; Halsey, Homer P.; and Troup, Robert L., 4,053,742, Cl. 364-506.000.

Hamaoui, Halfon N.: *See—*
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Hamaoui, Moise N., to Hamaoui, Moise N.; Hamaoui, Halfon N.; and Hacco, Robert, part interest to each. Card-reader integrated circuit tester. 4,053,844, Cl. 330-2.000.

Hamblen, David Philip; Glover, Clyde Pershing; and Kim, Sang Hyung, to Eastman Kodak Company. Device for determining ionic activity of components of liquid drops. 4,053,381, Cl. 204-195.00M.

Hamisch, Paul H., Jr., to Monarch Marking Systems, Inc. Apparatus for printing and applying pressure sensitive labels. 4,053,345, Cl. 156-384.000.

Hammann, Ingeborg: *See—*
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Hammerstrom, Knut; and Spielberger, Georg, to Bayer Aktiengesellschaft. Process for the continuous preparation of tetramethylethylene-diamine. 4,053,516, Cl. 260-585.00A.

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Hamrick, Joseph T.; and Rose, Leslie C., to World Energy Systems. Ignition process for downhole gas generator. 4,053,015, Cl. 166-302.000.

Handy, Robert M.: *See—*
Malmberg, Paul R.; Handy, Robert M.; Stoneburner, Donald F.; and Green, David, 4,053,833, Cl. 324-158.00R.

Haning, James O.; Kool, Bram; Moritz, Jules G.; and Mizrahi, Robert, to Microform Data Systems, Inc. Film strip handling apparatus and method. 4,053,215, Cl. 353-116.000.

Hanning Elektro Werke Robert Hanning: *See—*
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Hanning, Michael; and Mehrmann, Fritz, to Hanning Elektro Werke Robert Hanning. Stator for electric motor. 4,053,800, Cl. 310-43.000.

Hara, Toshitami; Hajimoto, Yoshioki; Shirato, Yoshiaki; and Matsushima, Masaaki, to Canon Kabushiki Kaisha. Electrochromic device. 4,053,209, Cl. 350-160.00R.

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Harmon, John P. Keying apparatus. 4,053,880, Cl. 340-365.00R.

Harney, Robert C., to United States of America, Energy Research and Development Administration. Method and apparatus for pulse stacking. 4,053,763, Cl. 250-206.000.

Harnisch, Heinz; Ehlers, Klaus-Peter; and Schrodter, Klaus, to Hoechst Aktiengesellschaft. Production of alkali metal phosphate solutions of low vanadium content. 4,053,562, Cl. 423-313.000.

Harper, Roland George, Jr., to Weatherford/Lamb, Inc. Apparatus for handling pipe at well site. 4,053,063, Cl. 214-2.500.

Harrer, Eunice, executrix: *See—*
Harrer, T. S., deceased; Karsay, B. I.; and Sturtevant, R. L., 4,053,573, Cl. 423-540.000.

Harrer, T. S., deceased (by Harrer, Eunice, executrix); Karsay, B. I.; and Sturtevant, R. L., to Allied Chemical Corporation. Recovery of sulfur values from spent sulfuric acid. 4,053,573, Cl. 423-540.000.

Harris Corporation: *See—*
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Harshaw Chemical Company, The: *See—*
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Hart, Cullen P., to Caterpillar Tractor Co. Constant pressure sealed fluid storage tank for hydraulic systems. 4,052,852, Cl. 60-478.000.

Hart, James E.; Shuck, David L.; and Lyon, Ward L., to Westinghouse Electric Corporation. Production of uranium dioxide. 4,053,559, Cl. 423-261.000.

Hart, John J., Jr., to International Paper Company. Combination shipping container and display box. 4,053,101, Cl. 229-36.000.

Hart, Russell F.: *See—*
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Hartig, Henry F.: *See—*
Ogilvie, LeRoy F.; and Hartig, Henry F., 4,053,701, Cl. 174-48.000.

Hartl, Alfons: *See—*
Reininger, Wolfgang; and Hartl, Alfons, 4,053,517, Cl. 260-586.00D.

Hartl, Walter, to U.S. Philips Corporation. High-voltage vacuum tube, particularly an x-ray tube. 4,053,802, Cl. 313-55.000.

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Haruyama, Osamu: *See—*
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Haskett, Philip R.: *See—*
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Hass, Winfield M.; Niehaus, Howard E.; and Pack, James L., to Southwire Company; and National Steel Corporation. Portable overhead crane and method of installing it. 4,053,059, Cl. 212-18.000.

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Hatano, Shogo: *See—*
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Hauck, Frederic Peter; Reid, Joyce; Narayanan, Venkatachala L.; Cimarusti, Christopher M.; Haugwitz, Rudiger D.; and Sundeen, Joseph E., to E. R. Squibb & Sons, Inc. Indanpentol derivatives. 4,053,596, Cl. 424-244.000.

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Haugwitz, Rudiger D.: *See—*
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Rovnyak, George C.; Narayanan, Venkatachala Lakshmi; and Haugwitz, Rudiger D., 4,053,613, Cl. 424-246.000.

Haushalter, Nathan. Emergency balloon device. 4,052,955, Cl. 116-124.00B.

Havens, Richard Calvin, to Motorola Inc. Q switching microwave oscillator. 4,053,854, Cl. 331-101.000.

Hawkes, Thaddeus: *See—*
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Hawkins, Joseph Key; and Cavanaugh, Leo Francis, to Robot Research, Inc. Enhancement of a video signal produced from information stored in a digital memory. 4,053,931, Cl. 358-134.000.

Hayashi, Toshio; Goto, Kazuo; and Haruyama, Osamu, to Ricoh Co., Ltd. Electrophotographic apparatus. 4,052,959, Cl. 118-644.000.

Hazen Research, Inc.: *See—*
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Healey, William E.; Heineman, Morse R.; Erlich, Ricky M.; and Remaley, James H., to W. E. Healey & Associates, Inc. Method for charging a fire protection system. 4,053,001, Cl. 141-2.000.

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Heath Company: *See*—
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Heiba, El-Ahmadi I.; Kinney, Robert E.; and Stead, George E., to Mobil Oil Corporation. Succinimides of amino aromatic sulfonic acid salts. 4,053,425, Cl. 252-33.000.
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Heidelberg, Eric X.: *See*—
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Evers, William J.; Heinsohn, Howard H., Jr.; and Vock, Manfred Hugo, 4,053,655, Cl. 426-535.000.
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Helton, Eugene L.: *See*—
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Henkel Kommanditgesellschaft auf Aktien: *See*—
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Henrichs, Paul: *See*—
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Herr, Peter Erwin, to Springbok Appointments (Proprietary) Limited. Stanchions. 4,052,872, Cl. 72-62.000.
Herrick, Rolland Clyde, to Philadelphia Gear Corporation. Self-synchronizing clutch. 4,053,038, Cl. 192-67.00A.
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Herrle, Karl; Gausepohl, Hermann; and Schwarz, Wolfgang, to BASF Aktiengesellschaft. Manufacture of vinylpyrrolidone polymers. 4,053,696, Cl. 526-65.000.
Hersey, William Hugh, Jr., to Mohawk Data Sciences Corporation. Calibration timing bands. 4,053,937, Cl. 360-77.000.
Hertel, John Edward, to United Technologies Corporation. Variable camber vane for a gas turbine engine. 4,053,256, Cl. 415-161.000.
Hertzberg, Martin; Litton, Charles D.; and Garloff, Randall, to United States of America, Interior. Sub-micron particle detector. 4,053,776, Cl. 250-382.000.
Herweh, John E.; and Whitmore, William Y., to Armstrong Cork Company. Block polymers from isocyanurate-based polyesters and conventional polyester segments. 4,053,538, Cl. 260-860.000.
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Hess, Ernst P., to Qume Corporation. Endless ribbon cartridge. 4,053,042, Cl. 197-168.000.
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Hinterberger, Henry, to United States of America, Energy Research and Development Administration. Non-tracking solar concentrator with a high concentration ratio. 4,052,976, Cl. 126-271.000.
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Hoffmann, Werner; Mueller, Norbert; and Paust, Joachim, to BASF Aktiengesellschaft. Nopinylamines. 4,053,511, Cl. 260-563.00P.
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Holbek, Kjeld. Method of preparing products comprising mineral fibres and a binder. 4,053,322, Cl. 106-99.000.
Holden, Kenneth G., to SmithKline Corporation. Process for preparing 7-oxo cephalosporins and 6-oxo penicillins. 4,053,468, Cl. 260-243.00C.

Holford, Kenneth, to U.S. Philips Corporation. Doppler radar system. 4,053,887, Cl. 343-9.000.

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Hollyday, Robert David; and Hudson, William Jeffrey, Jr., to AMP Incorporated. Cable connectable bulkhead filter array. 4,053,199, Cl. 339-147.00R.

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Holter, Heinz. Coke-oven plants. 4,053,366, Cl. 202-227.000.

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Honebrink, Roger Wayne; Johnson, Leslie Harold; and Lo, David Shih-Fang, to Sperry Rand Corporation. Thermoplastic optical recording medium using IR wave length. 4,053,872, Cl. 340-173.0TP.

Honeywell Inc.: *See—*
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Hosokawa, Akira; Miyazaki, Yukifusa; Yada, Yoshio; Kitamura, Yasuo; and Takeda, Masasi, to Toray Industries, Inc. Screw for use in an extruder. 4,053,143, Cl. 366-89.000.

Hosta Pujol, Alfonso; and Brosa Rabassa, Salvador, to Doctor Andreu S.A. Derivatives of 3,3-bis-(4-hydroxyphenyl)-2-indolinone and process for the preparation thereof. 4,053,483, Cl. 260-325.00R.

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Hounsfield, Godfrey Newbold, to E M I Limited. Packing member for radiographic positioning means. 4,053,781, Cl. 250-456.000.

Houston, Herbert J.; and Bolt, Kenneth D., to Slater Steel Industries Limited. Suspe sion bracket and apparatus. 4,053,706, Cl. 174-149.00R.

Howard, Laurence M.; and Schaaf, Robert, to Air Filters, Inc. Filter press assembly. 4,053,416, Cl. 210-227.000.

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Hunter, H. Eric, to Charter-Wallace, Inc. Method for assembling micro-filter units. 4,052,779, Cl. 29-429.000.

Hup, Gerhard; and Stadhouders, Jacobus Josephus, to Stichting Bedrijven Van Het Nederlands Instituut voor Zuivelonderzoek. Starter culture production. 4,053,642, Cl. 426-36.000.

Hurt, William S., to Rohm and Haas Company. O,S-Dialkyl O-sulfonyloxyphenyl phosphorothiolates and phosphorodithioates. 4,053,499, Cl. 260-456.00P.

Hurwitz, Harold S.; and Dyas, Harold E., to Bell & Howell Company. Low cost transfer ink coating. 4,053,660, Cl. 427-153.000.

Hutchins, Donald H., to Hutchins Manufacturing Company. Abrading tool suction system. 4,052,824, Cl. 51-170.0MT.

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Hutson, Thomas, Jr., to Phillips Petroleum Company. Process for producing isoparaffin-olefin alkylate having improved octane number. 4,053,535, Cl. 260-683.490.

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Hyler, John H., to Westinghouse Air Brake Company. Spring suspension arrangement for off-road vehicles. 4,053,171, Cl. 280-112.00R.

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in't Veld, Cornelis, to National Marine Service, Inc. Oil recovery apparatus. 4,053,414, Cl. 210-117.000.
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Nadeau, Raymond R.; and Wyman, John E., 4,053,319, Cl. 106-2.000.
Ithaca Gun Company, Inc.: *See*—
Tollinger, James, 4,052,926, Cl. 89-1.00K.
Ito, Fumio: *See*—
Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Nakamoto, Soichi, 4,053,909, Cl. 354-105.000.
Ito, Tadashi: *See*—
Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Nakamoto, Soichi, 4,053,909, Cl. 354-105.000.
Itoi, Kazuo: *See*—
Fujita, Yoshiji; Omura, Yoshiaki; Mori, Fumio; Itoi, Kazuo; Nishida, Takashi; Tamai, Yoshin; Aihara, Sukeji; Hosogai, Takeo; and Wada, Fumio, 4,053,380, Cl. 204-163.00R.
Itria, Oswald A., to Texaco Inc. Use for a seismic energy pulse generator for generating and shaping a seismic energy pulse. 4,053,027, Cl. 181-118.000.
ITT Industries, Inc.: *See*—
Goodwin, Anthony Richard, 4,053,914, Cl. 357-17.000.
Iwamitsu, Yasuyuki; and Kobayashi, Shigeru, to Tekken Construction Co. Ltd. Method and apparatus of completing slurry shield tunneling at vertical shaft. 4,052,859, Cl. 61-42.000.
Iwata, Hiroshi; and Ishikawa, Katsuji, to West Electric Co., Ltd. Program-controlled shutter. 4,053,907, Cl. 354-29.000.
Iwatate, Fujio: *See*—
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, 4,053,898, Cl. 346-1.000.
J. C. Moore Research, Inc.: *See*—
Moore, Jesse C., 4,053,544, Cl. 261-145.000.
J. I. Case Company: *See*—
McDonald, Raymond F., 4,053,032, Cl. 188-77.00R.
J. J. & M.: *See*—
Persik, James E.; and Persik, Gerald E., 4,052,871, Cl. 72-44.000.
J. K. and Susie L. Wadley Research Institute and Blood Bank: *See*—
Dorn, Gordon L., 4,053,363, Cl. 195-103.50M.
Jaecklin, Andre; and Vlasak, Thomas, to BBC Brown Boveri & Company Limited. Semiconductor component having emitter short circuits. 4,053,921, Cl. 357-38.000.
Jahns, Thomas M.: *See*—
Kornrumpf, William P.; and Jahns, Thomas M., 4,053,813, Cl. 315-206.000.
Jakobi, Dieter, to Bendix Corporation, The. Proportional valve apparatus for use in a rear brake system of a vehicle. 4,053,186, Cl. 303-6.00C.
James, Bertram G., to Varian Associates, Inc. Lossless traveling wave booster tube. 4,053,810, Cl. 315-3.600.
James, Lewis C., to Cities Service Research and Development Company. Start-up procedure for a residual oil processing unit. 4,053,390, Cl. 208-143.000.
Jamieson, Geoffrey A.: *See*—
Ciko, John D.; Cramer, John J.; and Jamieson, Geoffrey A., 4,053,423, Cl. 252-8.750.
Japan Atomic Energy Research Institute: *See*—
Kumahara, Tadashi; and Kinbara, Seturo, 4,053,847, Cl. 330-277.000.
Japan Synthetic Rubber Co., Ltd.: *See*—
Watabe, Yoji; Ishii, Michio; Iseda, Yutaka; Komatsu, Kouei; Ohshima, Noboru; and Nakata, Yozo, deceased, 4,053,446, Cl. 260-37.00N.
Japan Tobacco and Salt Public Corporation, The: *See*—
Ainoya, Koh; and Koyama, Nobuyuki, 4,053,741, Cl. 364-478.000.
Jaramillo, Jorge, to Ayerst, McKenna & Harrison Limited. Method for improving anesthesia and compositions therefor. 4,053,604, Cl. 424-258.000.
Jasper, Mark Friedel, to American Hospital Supply Corporation. Packaged additive cap. 4,053,052, Cl. 206-439.000.
Jaspers, Hendrik A.: *See*—
du Pre, Frits K.; and Jaspers, Hendrik A., 4,052,854, Cl. 60-524.000.
Jaworski, Eugene: *See*—
Breslow, Jeffrey D.; and Jaworski, Eugene, 4,053,158, Cl. 273-135.00R.
Jay, Ronald W.: *See*—
Cullinan, Robert L.; Jay, Ronald W.; Beck, Keith; and Miller, Lloyd J., 4,052,880, Cl. 72-326.000.
Jelinek, Jerry George, to Parker-Hannifin Corporation. Seal for ball bearing screws and the like. 4,053,167, Cl. 277-165.000.
Jelks, James W. Process of increasing the digestability of cellulosic material using nitric acid. 4,053,645, Cl. 426-53.000.
Jennings, Russell A. Portable shuffle desk. 4,052,944, Cl. 108-43.000.
Jensen, Lyle B.; and Powers, C. Wayne, to FMC Corporation. Suspended extensible boom. 4,053,058, Cl. 212-8.00R.
Jeppson, Morris R. Method and apparatus integrating water treatment and electrical power production. 4,052,858, Cl. 60-648.000.
Jerobee Industries, Inc.: *See*—
Weglin, Walter, 4,053,348, Cl. 156-515.000.
Jersak, Ulrich; and Scheuermann, Horst, to BASF Aktiengesellschaft. Manufacture of halonitrobenzenes. 4,053,527, Cl. 260-646.000.
Jestice, James E.; and Weatherby, Robert G., to Weatherby & Associates, Inc. Linear indexer. 4,053,250, Cl. 408-3.000.

Jeumont-Schneider: *See*—
Velu, Roger G.; Picandet, Jean A.; and Boullier, Francois M., 4,053,709, Cl. 179-18.0AD.

Jno H. Swisher & Son, Inc.: *See*—
Roark, Eugene, 4,053,046, Cl. 206-274.000.

Jo, Hong-Kyu, to UOP Inc. Fractionation process. 4,053,392, Cl. 208-354.000.

Jo-Line Tools, Inc.: *See*—
Solomon, Donald F., 4,053,037, Cl. 192-43.100.

Johannes, Walter, to Eastman Kodak Company. Nonmechanical shearing mixer. 4,053,142, Cl. 366-165.000.

John Wyeth & Brother Limited: *See*—
Boyle, John Terence Arnott; and Saunders, John Christopher, 4,053,615, Cl. 424-267.000.

Johnson, Leonard A.: *See*—
Erickson, Roy D.; Johnson, Leonard A.; and Porwit, Edward I., 4,053,702, Cl. 174-73.00R.

Johnson, Leslie Harold: *See*—
Honebrink, Roger Wayne; Johnson, Leslie Harold; and Lo, David Shih-Fang, 4,053,872, Cl. 340-173.0TP.

Johnson, Marvin M.: *See*—
Stapp, Paul R.; and Johnson, Marvin M., 4,053,524, Cl. 260-631.00H.

Johnson, Matthey & Co., Limited: *See*—
Acres, Gary James Keith, 4,053,556, Cl. 423-239.000.

Johnson, Robert B.: *See*—
Morse, Hugh B.; Johnson, Robert B.; and Masch, Helmut E. W., 4,052,931, Cl. 93-36.010.

Johnson, Robert H., to Motorola, Inc. Non-linear spread spectrum transmitter/receiver for a homing system. 4,053,889, Cl. 343-17.2PC.

Jones, Donald J.; and Berkebile, Gary W., to Westinghouse Electric Corporation. Transducer out of range protection for a steam turbine generator system. 4,053,786, Cl. 290-52.000.

Jones, Howard: *See*—
Shen, Tsung-Ying; Jones, Howard; and Dorn, Conrad P., 4,053,606, Cl. 424-263.000.

Jonner, Wolf-Dieter, to Teldix GmbH. Circuit arrangement for antilocking control system. 4,053,188, Cl. 303-96.000.

Jorgensen, Stanley A.; and Myers, Kenneth R., to Caterpillar Tractor Co. Positioning means for a windshield wiper arm assembly. 4,053,179, Cl. 296-28.00C.

Josenhans, Frederick G. Billiard-bridge and stroke trainer. 4,053,153, Cl. 273-23.000.

Journot, Vida M. Manually indexed visual test recording apparatus. 4,052,799, Cl. 35-48.00R.

Joy Manufacturing Company: *See*—
Ingalls, Robert A., 4,053,263, Cl. 418-201.000.

Joy, Richard C.: *See*—
Burr, Peter; Joy, Richard C.; and Ziegler, James F., 4,053,925, Cl. 357-64.000.

Junge, Helmut, to BASF Aktiengesellschaft. Heterocyclic azo pigments. 4,053,463, Cl. 260-154.000.

Jungers, James W.; and Hoyt, Edwin R., to Pioneer Manufacturing Inc. Joint and method for connecting structural members. 4,052,832, Cl. 52-496.000.

Jungr, Vaclav; Stoy, Artur; Stoy, Vladimir; and Zima, Jiri, to Ceskoslovenska akademie ved. Method for manufacturing shaped articles from multi-block copolymers. 4,053,442, Cl. 260-29.60R.

Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft: *See*—
Breitenbach, Otto, 4,053,835, Cl. 325-51.000.

Kabushiki Kaisha Bunshodo: *See*—
Kimura, Masanori; and Irino, Koji, 4,053,314, Cl. 96-49.000.

Kabushiki Kaisha Daini Seikosha: *See*—
Tatsumi, Youji, 4,053,289, Cl. 51-281.00R.

Kabushiki Kaisha Keihin Seiki Seisakusho: *See*—
Yoshioka, Yuichi; and Sanka, Tsugio, 4,053,449, Cl. 261-44.00R.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Takeda, Tashiro, 4,053,018, Cl. 172-4.500.

Kabushiki Kaisha Ogura Chuck Seisakusho: *See*—
Sakamoto, Kaneaki, 4,052,875, Cl. 72-217.000.

Kabushiki Kaisha Osaka Packing Seizosho: *See*—
Kishino, Junji, 4,053,268, Cl. 425-84.000.

Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See*—
Hukuta, Masakazu, 4,053,083, Cl. 220-202.000.

Kagechika, Katsumi: *See*—
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Kageyama, Yoichi, to Mitsubishi Chemical Industries Ltd. Method of decomposing chlorohydrocarbons. 4,053,557, Cl. 423-240.000.

Kaji, Tetsunori; and Mizushima, Masashi, to Hitachi, Ltd. System for driving a display device. 4,053,812, Cl. 315-169.0TV.

Kallianos, Andrew G.: *See*—
Cartwright, William F.; Means, Richard E.; Kallianos, Andrew G.; and Ross, J. Bowen, Jr., 4,052,993, Cl. 131-9.000.

Kaltenbronn, James S.: *See*—
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Kamatics Corporation: *See*—
Orkin, Stanley S.; and Nagy, Edward John, 4,053,665, Cl. 427-385.00C.

Kaminstein, Bernard, to Litton Industries, Inc. Handle grip material. 4,053,676, Cl. 428-310.000.

Kammlah, Henry W.; Herring, Harold K.; and Koch, Duane E., to Armour and Company. Measuring the tenderness of cooked beef. 4,052,890, Cl. 73-81.000.

Kamosaki, Minoru: *See*—
Ando, Ken; Kamosaki, Minoru; Ohya, Yoshinobu; and Asai, Sigeru, 4,053,672, Cl. 428-207.000.

Kampfer, John G.; and Ingram, Lucian A., to Halliburton Company. Method and apparatus for stabilizing signals in radioactive well logging tools. 4,053,767, Cl. 250-252.000.

Kanazawa, Shigenori: *See*—
Kato, Masumi; Kanazawa, Shigenori; and Oshikawa, Kiyomitsu, 4,053,175, Cl. 280-745.000.

Kang, S. Daniel, to Motorola, Inc. Integrated logic elements with improved speed-power characteristics. 4,053,923, Cl. 357-51.000.

Kano, Gota: *See*—
Koike, Susumu; Kano, Gota; and Teramoto, Iwao, 4,053,798, Cl. 307-238.000.

Kao, Charles T.: *See*—
Lafevers, James O.; and Kao, Charles T., 4,053,737, Cl. 235-61.11D.

Kao, Wenling; and Strike, Donald P., to American Home Products Corporation. Prostaglandin derivatives. 4,053,467, Cl. 260-240.00R.

Kapasi, Vikram C.; Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, to Pandel-Bradford, Inc. Imitation sheet material with surface grain appearance. 4,053,669, Cl. 428-151.000.

Karl, Robert. System for utilizing heat contained in flue gas. 4,053,106, Cl. 237-8.00R.

Karobath, Ernst; Rippel, Leopold; Pulitzer, Wolfgang; and Schmidinger, Hans, to Telephon- und Telegraphen-Fabriks-Aktiengesellschaft Kapsch & Sohne in Wien. Apparatus for the manufacture of pressed bodies of depolarizing material for galvanic cells. 4,053,273, Cl. 425-357.000.

Karpat, Arpad: *See*—
Csizy, Tibor; Karpat, Arpad; and Melis, Janos, 4,053,862, Cl. 337-221.000.

Karpisek, Ladislav Stephan. Pallet cages. 4,053,079, Cl. 217-43.00A.

Karsay, B. I.: *See*—
Harrer, T. S., deceased; Karsay, B. I.; and Sturtevant, R. L., 4,053,573, Cl. 423-540.000.

Kashima, Tsunehiro: *See*—
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Kastening, Bertel; and Knittel, Dierk, to Kernforschungsanlage Julich GmbH. Process for producing sulfones. 4,053,402, Cl. 204-59.00R.

Kasuga, Muneo: *See*—
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Kataoka, Mitsuru: *See*—
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Kathawala, Faizulla G.: *See*—
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Kato, Hisatoyo; and Miyahara, Junji, to Fuji Photo Film Co., Ltd. Rear projection screens. 4,053,208, Cl. 350-117.000.

Kato, Masumi; Kanazawa, Shigenori; and Oshikawa, Kiyomitsu, to Nippondenso Co., Ltd. Passive seat belt system. 4,053,175, Cl. 280-745.000.

Kato, Shuzo; Iga, Takeo; Hatano, Shogo; and Isawa, Yuichi, to Agency of Industrial Science & Technology. Method for manufacture of sintered alumina from ammonium aluminum carbonate hydroxide. 4,053,579, Cl. 423-630.000.

Katow, Keigo: *See*—
Ando, Masahisa; Katow, Keigo; and Yamazaki, Masami, 4,052,969, Cl. 123-119.00A.

Katsube, Hideo: *See*—
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Katz, Leonard R.; Marshall, James R.; and Desmarchais, Walter E., to Westinghouse Electric Corporation. Fuel transfer system for a nuclear reactor. 4,053,067, Cl. 214-18.00N.

Katzer, Ernst, to Knorr-Bremse GmbH. Mount for a railway vehicle disc brake. 4,053,034, Cl. 188-206.00R.

Kauffman, Robert Carl. Portable writing means. 4,053,133, Cl. 248-452.000.

Kaufman, Martin H.: *See*—
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Kawaharada, Minoru: *See*—
Yoshiwara, Seishiro; Kawaharada, Minoru; and Yanagimoto, Samon, 4,052,874, Cl. 72-209.000.

Kawai, Jun: *See*—
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Kawai Musical Instrument Mfg. Co. Ltd.: *See*—
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Kawamura, Tadashi, to Tokyo Shibaura Electric Co., Ltd. Automatic centrifuge safety latch system. 4,053,411, Cl. 210-146.000.

Kawasaki Heavy Industries, Ltd.: *See*—
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Kawazu, Mitsutaka; Wagatsuma, Mitsuyoshi; Seto, Masahiko; Miyagishima, Toshikazu; Yamaguchi, Totaro; and Ohshima, Satoshi, to Tanabe Seiyaku Co., Ltd. Penicillins and processes for preparing the same. 4,053,609, Cl. 424-271.000.

Kay, Leslie. Methods of and apparatus for ascertaining the characteristics of motion of inaccessible moving elements. 4,052,977, Cl. 128-2.00V.

Kayser, Detlev: *See—*
Schacht, Erich; Mehrhof, Werner; Nowak, Herbert; Simane, Zdenek; and Kayser, Detlev, 4,053,626, Cl. 424-275.000.
Kearney, Kevin David Nicolas: *See—*
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Keeling & Walker Limited: *See—*
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Keller, Bruce W.: *See—*
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Kelly, Judith Margaret; and Meers, John Laurence, to Imperial Chemical Industries Limited. Process for the preparation of glucose isomerase using Curtobacterium. 4,053,361, Cl. 195-66.00R.
Kelly, Ronald L.; and Ostrowsky, Efrem M., to VCA Corporation. Cap and valve actuator for spray dispensers. 4,053,090, Cl. 222-402.130.
Kelso Marine, Inc.: *See—*
Linam, Richard L., 4,053,097, Cl. 228-44.10R.
Kelterbaum, Manfred: *See—*
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"Keramag" Keramische Werke AG: *See—*
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Kernforschungsanlage Julich GmbH: *See—*
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Kerr, Edwin R.; Dorawala, Tansukhlal G.; and Reinhard, Russell R., to Texaco Inc. Steam reforming of polycyclic hydrocarbons. 4,053,531, Cl. 260-672.00R.
Kerr Glass Manufacturing Corporation: *See—*
Herr, James E., 4,053,078, Cl. 215-222.000.
Kessler, Hans-Joachim: *See—*
Rufer, Clemens; Schroder, Eberhard; and Kessler, Hans-Joachim, 4,053,472, Cl. 544-139.000.
Keve, Edward T.; and Bye, Keith L., to U.S. Philips Corporation. Electro-optic devices. 4,053,207, Cl. 350-150.000.
Khalafalla, Sanaa E.: *See—*
Haas, Larry A.; and Khalafalla, Sanaa E., 4,053,575, Cl. 423-575.000.
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Kim, Sang Hyung: *See—*
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Kimmel, Richard; and Pickens, Robert C., Jr., to Brunswick Corporation. Tufted carpenting with unitary needlebonded backing and method of manufacturing the same. 4,053,668, Cl. 428-95.000.
Kimura, Masanori; and Irino, Koji, to Kabushiki Kaisha Bunshodo. Amine developer liquid for diazotype reproduction. 4,053,314, Cl. 96-49.000.
Kinbara, Seturo: *See—*
Kumahara, Tadashi; and Kinbara, Seturo, 4,053,847, Cl. 330-277.000.
King, Jerry A., to United Technologies Corporation. Apparatus for making metal powder. 4,053,264, Cl. 425-8.000.
Kinney, Robert E.: *See—*
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Kirby, Raymond L., to Monarch Marking Systems, Inc. Printing apparatus. 4,052,938, Cl. 101-291.000.
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Kishimoto, Juji: *See—*
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Kishimoto, Teturo: *See—*
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Kishino, Junji, to Kabushiki Kaisha Osaka Packing Seizosho. Apparatus for molding a slurry of calcium silicate crystals. 4,053,268, Cl. 425-84.000.
Kita, Toru: *See—*
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Kitai, Haruo: *See—*
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Kitamura, Yasuo: *See—*
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Kitano, Noritoshi: *See—*
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Kitayama, Tatsuo; Kusama, Fumihiko; Tomaru, Seigo; and Ebinuma, Akira, to Showa Denko K. K. Process for manufacture of high-chromium iron alloy. 4,053,307, Cl. 75-130.500.
Kitsnik, Henrik Martin, to AB Kalle-Regulator, Industrivagen. Method and device for forming a filtering fiber cake in an apparatus for measuring the beating degree of pulp flowing through a conduit. 4,053,354, Cl. 162-198.000.
Kitzes, Arnold S.: *See—*
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Kiuchi, Eiichi: *See—*
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Kivi, Aare; and Feit, Louis, to International Telephone and Telegraph Corporation. Method and arrangement to eliminate multipacting in RF devices. 4,053,855, Cl. 333-73.00W.
Klein, Donald L.: *See—*
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Kleiner, Frank Gerald; Radojewski, Hans; Muhlbauer, Richard; and Muller, Karl-Heinz, to Bayer Aktiengesellschaft. Laminates of polyethylene foam with an anisotropic pore structure. 4,053,341, Cl. 156-79.000.
Kleische, Wilhelm, to Licentia Patent-Verwaltungs-G.m.b.H. Circuit arrangement for combining high frequency power components. 4,053,848, Cl. 330-53.000.
Kline, William Mathes, to Medical Evaluation Devices and Instruments Corporation. Needle catheter. 4,052,989, Cl. 128-349.00R.
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Knapp, Edward J., Jr., to Gould, Inc. Electric time-lag fuse having a small current rating. 4,053,861, Cl. 337-165.000.
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Knoedl, George, Jr. Method and apparatus for the frequency multiplication of composite waves. 4,053,839, Cl. 328-38.000.
Knorr-Bremse GmbH: *See—*
Katzer, Ernst, 4,053,034, Cl. 188-206.00R.
Koashi, Katsue: *See—*
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Kobayakawa, Toshihiro: *See—*
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Koch, Karlheinz; and Kroke, Hermann, to Henkel Kommanditgesellschaft auf Aktien. Branched-chain aliphatic ester oils. 4,053,491, Cl. 260-410.600.
Kogame, Kunio: *See—*
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Kohjin Co., Ltd.: *See—*
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Kohshoh Limited: *See—*
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Koike, Susumu; Kano, Gota; and Teramoto, Iwao, to Matsushita Electronics Corporation. Negative resistance device. 4,053,798, Cl. 307-238.000.
Koito Manufacturing Company Limited: *See—*
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Kokusai Gijutsu Kaihatsu Kabushiki Kaisha: *See—*
Nakauchi, Shunsaku; and Takahashi, Akifusa, 4,053,939, Cl. 361-171.000.
Kollman, Delhardt K.: *See—*
Hale, David Jerry; Mayer, William B.; and Kollman, Delhardt K., 4,052,952, Cl. 115-41.0HT.
Kollmeyer, Willy D., to Shell Oil Company. 2-Substituted-2-(acetoxyethyl) esters of (1-methyl-2-imidazolidinylidene) nitroacetic acid. 4,053,619, Cl. 424-273.00R.
Kollmeyer, Willy D., to Shell Oil Company. Phenyl esters of 3-methyl-2-(1-nitro-2-oxo-2-phenoxyethylidene)-1-imidazolidinecarboxylic acids. 4,053,622, Cl. 424-273.00R.
Kollmeyer, Willy D.: *See—*
Porter, Paul E.; and Kollmeyer, Willy D., 4,053,623, Cl. 424-273.00R.
Komatsu, Kouei: *See—*
Watabe, Yoji; Ishii, Michio; Iseda, Yutaka; Komatsu, Kouei; Ohshima, Noboru; and Nakata, Yozo, deceased, 4,053,446, Cl. 260-37.00N.
Konig, Wolfgang; Geiger, Rolf; Wissmann, Hans; Kruse, Hansjorg; and Peterfalvi, Michel, to Hoechst Aktiengesellschaft. Pharmaceutical preparations having psychotropic activity and process for their manufacture. 4,053,588, Cl. 424-177.000.
Konishi, Mitsuhiro: *See—*
Yamanaka, Tsutomu; Kobayakawa, Toshihiro; Konishi, Mitsuhiro; and Ikeda, Kuniki, 4,053,478, Cl. 260-295.00R.
Kool, Bram: *See—*
Haning, James O.; Kool, Bram; Moritz, Jules G.; and Mizrahi, Robert, 4,053,215, Cl. 353-116.000.
Koppers Company, Inc.: *See—*
Gidick, Ward Francis, 4,053,068, Cl. 214-18.00R.
Huiskes, Johannus Martinus, 4,052,932, Cl. 93-49.00R.

Kornreich, Philipp G.; and Kowel, Stephen T. Measuring the quality of images. 4,053,934, Cl. 358-213.000.

Kornrumpf, William P.; and Jahns, Thomas M., to General Electric Company. Discharge lamp ballast with resonant starting. 4,053,813, Cl. 315-206.000.

Koshar, Robert J.; and Barber, Loren L., Jr., to Minnesota Mining and Manufacturing Company. 1,1,3,3-Tetrakis(perfluoroalkylsulfonyl)-propanes. 4,053,519, Cl. 260-607.0AL.

Kosmos, Peter: *See*—
Tesk, John A.; Dudek, Ronald P.; and Kosmos, Peter, 4,053,308, Cl. 75-171.000.

Kovacs, Bela V.: *See*—
Smartt, Herschel B.; and Kovacs, Bela V., 4,053,146, Cl. 266-216.000.

Kovalev, Gennady Ivanovich: *See*—
Selivanov, Anatoly Grigorievich; and Kovalev, Gennady Ivanovich, 4,053,000, Cl. 139-436.000.

Kovener, Gary S.: *See*—
Sheridan, Lee A.; Kovener, Gary S.; Ostrofsky, Bernard; and Nebelsiek, Hilbert J., 4,052,887, Cl. 73-67.80S.

Kowalski, John Lawrence; and Tippetts, Kenneth Boyd, to Honeywell Information Systems Inc. Sequencer. 4,053,065, Cl. 214-6.00M.

Kowel, Stephen T.: *See*—
Kornreich, Philipp G.; and Kowel, Stephen T., 4,053,934, Cl. 358-213.000.

Koyama, Nobuyuki: *See*—
Ainoya, Koh; and Koyama, Nobuyuki, 4,053,741, Cl. 364-478.000.

Kozacka, Frederick J.; and Belcher, Richard A., to Gould, Inc. Electric fuse. 4,053,860, Cl. 337-164.000.

Kraftwerk Union Aktiengesellschaft: *See*—
Daublebsky, Peter, 4,053,080, Cl. 220-3.000.

Kramer, Daniel E. Pressure switch for outdoor refrigeration systems. 4,053,725, Cl. 200-81.00R.

Kramer, Vance M., Jr.: *See*—
Kramer, Vance M., Sr.; and Kramer, Vance M., Jr., 4,053,275, Cl. 425-389.000.

Kramer, Vance M., Sr.; and Kramer, Vance M., Jr. Apparatus for making flexible corrugated rubber tubing. 4,053,275, Cl. 425-389.000.

Kramer, Wolfgang: *See*—
Buchel, Karl Heinz; Kramer, Wolfgang; Brandes, Wilhelm; and Frohberger, Paul-Ernst, 4,053,616, Cl. 424-269.000.

Krapcho, John, to E. R. Squibb & Sons, Inc. 4-Thiazolidinone derivatives. 4,053,471, Cl. 544-133.000.

Krapcho, John; and Schwartz, Joseph, to E. R. Squibb & Sons, Inc. 2-[Dialkylaminoalkoxyphenyl]-methylene-2,3-dihydro-1H-inden-1-ones and the salts thereof. 4,053,514, Cl. 260-570.00R.

Kraus, Charles E., to Excelermatic, Inc. Traction roller transmission. 4,052,915, Cl. 74-798.000.

Krekeler, Jerome H.; Kirch, William; and Aboutboul, Henri A., to National Petro Chemicals Corporation. Silica xerogels. 4,053,565, Cl. 423-338.000.

Krenzer, John, to Velsicol Chemical Corporation. Herbicidal compositions containing 1-thiadiazolyl-6-carbamoyloxytetrahydropyrimidinones and methods therefor. 4,053,298, Cl. 71-90.000.

Krenzer, John, to Velsicol Chemical Corporation. 1-Thiadiazolyl-5-phenoxy- and phenylthioalkanoyloxy imidazolidinones. 4,053,480, Cl. 260-306.80D.

Kriechbaum, Karl, to Licentia Patent-Verwaltungs-G.m.b.H. Arc blow-out switch. 4,053,727, Cl. 200-148.00A.

Kroder, Ernest A.: *See*—
McCandless, William; Leu, Robert F.; Kroder, Ernest A.; and Tomecek, Charles J., 4,052,821, Cl. 51-53.000.

Kroenke, William Joseph; and McRowe, Arthur Watkins, to B. F. Goodrich Company, The. Smoke retardant vinyl chloride and vinylidene chloride polymer compositions. 4,053,451, Cl. 260-45.75C.

Kroenke, William Joseph, to B. F. Goodrich Company, The. Smoke retardant vinyl chloride and vinylidene chloride polymer compositions. 4,053,452, Cl. 260-45.75M.

Kroenke, William Joseph, to B. F. Goodrich Company, The. Smoke retardant vinyl chloride and vinylidene chloride polymer compositions. 4,053,454, Cl. 260-45.75N.

Kroenke, William Joseph, to B. F. Goodrich Company, The. Smoke retardant vinyl chloride and vinylidene chloride polymer compositions. 4,053,455, Cl. 260-45.75R.

Kroenke, William Joseph: *See*—
McRowe, Arthur Watkins; and Kroenke, William Joseph, 4,053,453, Cl. 260-45.75C.

Kroke, Hermann: *See*—
Koch, Karlheinz; and Kroke, Hermann, 4,053,491, Cl. 260-410.600.

Kruckenberg, Winfried, to Bayer Aktiengesellschaft. Cyanophenylazo-aminophenyl dyestuffs. 4,053,465, Cl. 260-207.300.

Krueger, William Henry: *See*—
Riewald, Paul Gordon; Krueger, William Henry; and Dhingra, Ashok Kumar, 4,053,011, Cl. 164-97.000.

Krupke, William F., to United States of America, Energy Research and Development Administration. Near 16 micron CO_2 laser system. 4,053,851, Cl. 331-94.50G.

Krupke, William F., to United States of America, Energy Research and Development Administration. Method and apparatus for generating coherent near 14 and near 16 micron radiation. 4,053,852, Cl. 331-94.50G.

Kruse, Hansjorg: *See*—
Konig, Wolfgang; Geiger, Rolf; Wissmann, Hans; Kruse, Hansjorg; and Peterfalvi, Michel, 4,053,588, Cl. 424-177.000.

Kueppers, Horst William. Techniques for determining the peak angle of response of piezoelectric crystals and other radiation-sensitive resonant devices. 4,053,748, Cl. 364-525.000.

Kuffer, Fernand Bannie, to General Dynamics Corporation. Parallax free light pen. 4,053,765, Cl. 250-227.000.

Kuhfuss, Alvin L., Jr., to Caterpillar Tractor Co. Removable filter assembly with bypass valve. 4,053,409, Cl. 210-130.000.

Kulak, Walter J. Method for framing a jig-saw puzzle. 4,053,159, Cl. 273-157.00R.

Kumahara, Tadashi; and Kinbara, Seturo, to Japan Atomic Energy Research Institute. Self-feedback type low-noise charge sensitive amplifier. 4,053,847, Cl. 330-277.000.

Kumoda, Masashi: *See*—
Tatara, Seiji; Morita, Yasuo; Nishonomiya, Makoto; and Kumoda, Masashi, 4,053,429, Cl. 252-187.00H.

Kuno, Akira: *See*—
Shinoda, Yoshio; and Kuno, Akira, 4,053,749, Cl. 364-424.000.

Kunz, Lawrence J., Jr.: *See*—
Zito, Ralph, Jr.; and Kunz, Lawrence J., Jr., 4,053,684, Cl. 429-15.000.

Kupersmit, Julius B. Static charge detector having fail-safe voltage surge protection means. 4,053,875, Cl. 340-248.00P.

Kupperman, Dennis I.: *See*—
Kupperman, Sam; and Kupperman, Dennis I., 4,052,812, Cl. 46-94.000.

Kupperman, Sam; and Kupperman, Dennis I., to R B Toy Development Co. Toy object that repeatedly submerges and rises in the water. 4,052,812, Cl. 46-94.000.

Kuraray Co., Ltd.: *See*—
Yamasaki, Tsuyoshi; and Kogame, Kunio, 4,053,546, Cl. 264-49.000.

Kurashiki Boseki Kabushiki Kaisha: *See*—
Miyake, Takao; and Koashi, Katsue, 4,053,114, Cl. 242-36.000.

Kurohata, Hitoshi; Kawai, Jun; and Hizuka, Nobuyoshi, to Matsushita Electric Industrial Co., Ltd. Channel indicator. 4,052,956, Cl. 116-124.10A.

Kurraray Co., Ltd.: *See*—
Fujita, Yoshiji; Omura, Yoshiaki; Mori, Fumio; Itoi, Kazuo; Nishida, Takashi; Tamai, Yoshin; Aihara, Sukeji; Hosogai, Takeo; and Wada, Fumio, 4,053,380, Cl. 204-163.00R.

Kusama, Fumihiko: *See*—
Kitayama, Tatsuo; Kusama, Fumihiko; Tomaru, Seigo; and Ebinuma, Akira, 4,053,307, Cl. 75-130.500.

Kusano, Makoto: *See*—
Shimizu, Tokihiko; Iijima, Yasuo; and Kusano, Makoto, 4,053,941, Cl. 361-319.000.

Kushner, Jack; and Zwirblis, Henry G., to Delta Scientific Corporation. Apparatus for obtaining a relatively particle-free sample of a liquid. 4,052,904, Cl. 73-421.00R.

Kusters, Eduard: *See*—
Ahrweiler, Karl-Heinz; Quoos, Kurt; and Kusters, Eduard, 4,053,276, Cl. 425-406.000.

Kuze, Yoshikazu. Photo sequence programmer. 4,053,784, Cl. 250-570.000.

Lach, Dietrich: *See*—
Bruenemann, Hilmar; Eilingsfeld, Heinz; and Lach, Dietrich, 4,053,488, Cl. 260-369.000.

Lack, Bryan Edward Charles; and Newman, Alec Thomas, to General Foods Limited. Dispenser for granular material. 4,053,087, Cl. 222-278.000.

Lacroix, Roger: *See*—
Bergez, Pierre; Lacroix, Roger; Plurien, Pierre; and Touboul, Jean-Paul, 4,053,662, Cl. 427-250.000.

Lafaye, Jean: *See*—
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Lafevers, James O.; and Kao, Charles T., to Recognition Equipment Incorporated. Magnetic reader for bar encoded characters. 4,053,737, Cl. 235-61.11D.

Lambert, Howard J.: *See*—
Chien, Yie W.; and Lambert, Howard J., 4,053,580, Cl. 424-15.000.

Lambeth, Peter John: *See*—
Ely, Cyril Harold Arthur; Lambeth, Peter John; and Looms, John Sidney Thomas, 4,053,707, Cl. 174-209.000.

Lamy, Jacques Edouard, to Compagnie Generale pour les Developpements Operationnels des Richesses Sous-Marines "C.G. Doris". Method of submerging pipelines. 4,052,862, Cl. 61-112.000.

Lane, Leslie A., to Cornelius Printing Co. Folder apparatus. 4,053,150, Cl. 270-67.000.

Lantor International Limited: *See*—
LePoutre, Roger, 4,053,670, Cl. 428-156.000.

Lanz, William E.; and Stepe, Visvaldis A., to Caterpillar Tractor Co. Loader bucket cutting edge with recessed bolt studs and method. 4,052,803, Cl. 37-141.00T.

Larsen, Robert H.: *See*—
Grover, Richard K.; and Larsen, Robert H., 4,053,193, Cl. 312-209.000.

Larsson, Nils Osten Arnold, to AB Ostgota-Byggen. Method in the production of a wall element and a wall tile for use in connection with the method. 4,052,825, Cl. 52-98.000.

Lasman, Henry R.: *See*—
Kapasi, Vikram C.; Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, 4,053,669, Cl. 428-151.000.

Lasserre, Pierre: *See*—
Dupuis, Jean-Michel; and Lasserre, Pierre, 4,053,824, Cl. 324-29.500.

Laver, Myron B.: *See—*
Bonsen, Pieter; Laver, Myron B.; and Morris, Kent C., 4,053,590, Cl. 424-177.000.
Laverick, Eric W.; and Horowitz, Allen I., to Hi-G Incorporated. Theftproof connector assembly. 4,053,195, Cl. 339-37.000.
Laverlochere, Jean: *See—*
Aude, Georges; and Laverlochere, Jean, 4,053,771, Cl. 250-328.000.
Lawson, Leslie Edward; Rogers, John Sleeman; and Watts, Peter Edward, to Vickers Limited. Printing plate water sensing means and method. 4,052,937, Cl. 101-147.000.
Lebenson, Robert J.: *See—*
Kapasi, Vikram C.; Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, 4,053,669, Cl. 428-151.000.
Lebow Associates, Inc.: *See—*
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Lecourt, Everett J.: *See—*
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Ledebur, Harry Calhoon: *See—*
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Lee, Bock W.; Vander Heyden, William H.; and Bell, Stephen S., to Badger Meter, Inc. Ultrasonic flow meter. 4,052,896, Cl. 73-194.00A.
Lee, George Herbert. Burgees. 4,052,957, Cl. 116-174.000.
Lee, Lieng-Huang, to Xerox Corporation. Durable carrier coating compositions comprising polysulfone. 4,053,310, Cl. 96-1.0SD.
Lee, Pui Kum, to Minnesota Mining and Manufacturing Company. Method of tagging with color-coded microparticles. 4,053,433, Cl. 252-408.000.
Lee, Ray H.: *See—*
Weinstein, Harold; and Lee, Ray H., 4,052,782, Cl. 29-572.000.
Lee, Sung Chuel; Podany, Vaclav Oldrich; and Costa, Hilario Simoes, to General Signal Corporation. Optical smoke detector with smoke effect simulating means. 4,053,785, Cl. 250-574.000.
Leedom, Marvin Allan: *See—*
Bleazey, John Clifford; and Leedom, Marvin Allan, 4,053,161, Cl. 274-23.00R.
Leffler, Nils, to Measurex Corporation. Method of controlling basis weight of a cylinder board machine. 4,053,353, Cl. 162-198.000.
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Pinnell, William R.; and Leger, James E., 4,052,894, Cl. 73-189.000.
LeGoff, Yves: *See—*
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Lehmkuhl A/S: *See—*
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Lehner, Gerald J.: *See—*
Banka, Eugene F.; and Lehner, Gerald J., 4,053,736, Cl. 235-61.11D.
Leibich, George Edward: *See—*
Wycheck, Thomas Joseph; and Leibich, George Edward, 4,053,720, Cl. 179-99.000.
Lemaire, Pierre. Device for handling a vehicle-carried container. 4,053,074, Cl. 214-515.000.
Lemelson, Jerome H. Tube wall forming apparatus. 4,053,274, Cl. 425-381.000.
Lemoine, Maurice G.; and Pasdera, Leonard A., to Ampex Corporation. Timing error compensator. 4,053,926, Cl. 358-8.000.
Leniewski, Leonard W.: *See—*
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LePoutre, Roger, to Lantor International Limited. Non-woven fabrics. 4,053,670, Cl. 428-156.000.
Lerner, Theodore, to Textron, Inc. Narrowband phase modulation communication system which eliminates thresholding. 4,053,834, Cl. 325-46.000.
Lesher, George Y.; and Singh, Baldev, to Sterling Drug Inc. N-[2-(Pyridinyl)-4-pyrimidinyl]ureas preparation. 4,053,475, Cl. 260-256.40N.
Lester, Robert James, to Coles Cranes Limited. Mobile crane. 4,053,061, Cl. 212-58.00R.
Leu, Robert F.: *See—*
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Lever Brothers Company: *See—*
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Levin, David. Liquid applicator. 4,053,243, Cl. 401-186.000.
Levy, Sidney. Apparatus for forming a composite tape. 4,053,269, Cl. 425-113.000.
Lewis, Bernard L.: *See—*
Cantrell, Ben H.; and Lewis, Bernard L., 4,053,884, Cl. 343-7.700.
Lewis, John H.; and McDiarmid, Michael D., to Xonics, Inc. Method and apparatus for improving contrast in electrophoretic display. 4,053,768, Cl. 250-315.00A.
Lewis, Sheldon N.: *See—*
Miller, George A.; and Lewis, Sheldon N., 4,053,479, Cl. 260-302.00A.
Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
Kleische, Wilhelm, 4,053,848, Cl. 330-53.000.
Kriechbaum, Karl, 4,053,727, Cl. 200-148.00A.
Schmidtmann, Burchard, 4,053,927, Cl. 358-29.000.
Liggett & Myers Incorporated: *See—*
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Limburg, William W.; Yanus, John F.; and Pai, Damodar M. Poly-N-vinylcarbazole image transport layer plasticized by bis(4-diethylamino-2-methylphenyl)phenylmethane. 4,053,311, Cl. 96-1.0PC.
Lin, Chiu-Hong, to Upjohn Company, The. 4,4,5,5-Tetradehydro-ω-aryl-$PGF_{1\alpha}$ analogs. 4,053,500, Cl. 560-60.000.
Lin, Chiu-Hong, to Upjohn Company, The. 4,4,5,5-Tetradehydro-ω-aryl-PGE_1 analogs. 4,053,502, Cl. 560-53.000.
Lin, Kang: *See—*
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Linam, Richard L., to Kelso Marine, Inc. Arrangement for placing and maintaining reinforcing members in predetermined relationship relative to a weldment component. 4,053,097, Cl. 228-44.10R.
Lindberg, Ulf Henrik Anders: *See—*
Carnmalm, Bernt Sigfrid Emanuel; Lindberg, Ulf Henrik Anders; de Paulis, Tomas; Ross, Svante Bertil; Stjernstrom, Nils-Erik; Ulff, Carl Bengt Johan; and Ogren, Sven-Ove, 4,053,637, Cl. 424-330.000.
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Link, Joseph: *See—*
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Litchfield, John H.; and Vely, Victor G., to William Wrigley Jr. Company. Anticaries confectioneries and oral health products. 4,053,638, Cl. 424-333.000.
Litton, Charles D.: *See—*
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Litton Industries, Inc.: *See—*
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Litton Systems Inc.: *See—*
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Liu, Joseph; Grimmett, Howard L.; and Hwang, Yu-Tang, to Chemplex Company. Polyolefin catalyst and method for its preparation. 4,053,437, Cl. 252-458.000.
Llona, Jesus Gomez. Panel and plural module assembly having mechanical keying and modular plug structure to activate/deactivate automatically bridged load carrying circuits. 4,053,724, Cl. 200-51.00R.
Lo, David Shih-Fang: *See—*
Honebrink, Roger Wayne; Johnson, Leslie Harold; and Lo, David Shih-Fang, 4,053,872, Cl. 340-173.0TP.
Locher, Anton: *See—*
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Lockheed Aircraft Corporation: *See—*
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Lockheed Missiles & Space Company Inc.: *See—*
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Lodholz, John C.: *See—*
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Logston, James L.: *See—*
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Lohmann, Dieter: *See—*
Fory, Werner; Fischer, Hanspeter; Lohmann, Dieter; and Greber, Gerd, 4,053,496, Cl. 260-448.80R.
Fory, Werner; Fischer, Hanspeter; Lohmann, Dieter; and Greber, Gerd, 4,053,497, Cl. 260-448.80R.
Loix, Gilbert. Apparatus suitable for use as stairways, stepladders and the like. 4,053,028, Cl. 182-1.000.
Lok-Rak Corporation of America: *See—*
Uccello, Salvatore A., 4,053,246, Cl. 403-233.000.
Long, Robert A.: *See—*
Ness, Phillip D.; and Long, Robert A., 4,053,249, Cl. 408-1.0BD.
Long, Robert G., to Canadian PGL Electronics Inc. Electrical data collecting device. 4,053,714, Cl. 179-15.0AL.
Longhetto, Francesco, to Semperit Anstalt. Depthometer for underwater immersion. 4,052,899, Cl. 73-300.000.
Longo, Joseph T.: *See—*
Andrews, Austin M., II; Clarke, John E.; Longo, Joseph T.; and Gertner, Edward R., 4,053,919, Cl. 357-30.000.
Looms, John Sidney Thomas: *See—*
Ely, Cyril Harold Arthur; Lambeth, Peter John; and Looms, John Sidney Thomas, 4,053,707, Cl. 174-209.000.
Lorimor, Larry W., to Caterpillar Tractor Co. Filter assembly with modulating bypass valve. 4,053,410, Cl. 210-132.000.
Lovaas, M. J.; and Voecks, Roger J., to Bucyrus-Erie Company. Boom point sheave assembly. 4,053,139, Cl. 254-190.00R.
Love, Phillip Wynell. Apparatus for lifting large bales of material. 4,053,069, Cl. 214-147.00G.
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Lu, Robert T., to ICI United States Inc. Photopolymerization of

ethylenically-unsaturated organic compounds. 4,053,316, Cl. 96-115.00P.

Lubrizol Corporation, The: *See*—
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Lucas, Bernard, to Padeg A.G. Package having individual isolated cells. 4,053,054, Cl. 206-534.000.

Lucas Electrical Company Limited, The: *See*—
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Lucas Industries Limited: *See*—
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Ludlow, Thomas B. Liquid dispenser with liquid level indicator. 4,053,002, Cl. 141-95.000.

Lundberg, Robert D.; and Makowski, Henry S., to Exxon Research & Engineering Co. Fabrication process for multiphased plastics. 4,053,548, Cl. 264-230.000.

Lutz, Andre: *See*—
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Lynch, Joseph A., to Nabisco, Inc. Article stacking and loading apparatus. 4,053,066, Cl. 214-7.000.

Lynch, Thomas, to Xerox Corporation. Multi-mode reproducing apparatus. 4,053,221, Cl. 355-60.000.

Lynch, Thomas J., to Gulf Research & Development Company. Catalysts for the polymerization of ethylene. 4,053,435, Cl. 252-451.000.

Lynes, Inc.: *See*—
Malone, Billy C.; and Coone, Malcolm G., 4,052,861, Cl. 61-86.000.

Lyon, Ward L.: *See*—
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M & T Chemicals Inc.: *See*—
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MacMillan, Robert: *See*—
Barbieri, Marcello, 4,053,779, Cl. 250-445.00T.

Madaus, Rolf Hermann Heinrich; and Gorler, Klaus, to Dr. Madaus & Co. Process for the preparation of antacid aluminum hydroxycarbonate hydrate. 4,053,568, Cl. 423-419.00P.

Maese, Masayuki: *See*—
Murata, Tomoji; and Maese, Masayuki, 4,053,733, Cl. 219-494.000.

Maher, John P.: *See*—
Rodriguez, George H.; and Maher, John P., 4,053,864, Cl. 338-22.0SD.

Mahlmann, James P., to General Foods Corporation. Roasted and ground coffee product and method. 4,053,652, Cl. 426-388.000.

Mailloux, Louis D., to Xerox Corporation. Color transparency reproducing machine. 4,053,216, Cl. 355-4.000.

Mailloux, Louis D., to Xerox Corporation. Color transparency reproducing machine. 4,053,217, Cl. 355-4.000.

Mair, Angus Campbell: *See*—
Fox, John Francis; Roylance, Thomas William; and Mair, Angus Campbell, 4,053,379, Cl. 204-160.100.

Makowski, Henry S.: *See*—
Lundberg, Robert D.; and Makowski, Henry S., 4,053,548, Cl. 264-230.000.

Malagisi, Carmen S., to United States of America, Air Force. Electronically scanned microstrip antenna array. 4,053,895, Cl. 343-700.0MS.

Malcolm, Robert Bruce: *See*—
Bitter, Charles Raymond, Jr.; and Malcolm, Robert Bruce, 4,053,896, Cl. 343-709.000.

Males, Robert E., to Textron, Inc. Cartridge containing continuous wire coil and portable device for cutting successive lengths from the wire and driving the same. 4,053,094, Cl. 227-93.000.

Malmberg, Paul R.; Handy, Robert M.; Stoneburner, Donald F.; and Green, David, to Westinghouse Electric Corporation. Contactless test method for integrated circuits. 4,053,833, Cl. 324-158.00R.

Malone, Billy C.; and Coone, Malcolm G., to Lynes, Inc. Inflatable securing arrangement. 4,052,861, Cl. 61-86.000.

Mancini, Robert; and Gentile, Vincenzo. Structural member. 4,052,828, Cl. 52-242.000.

Manilla, George T., to Intermountain Laboratories, Inc. Preparation for treating squamous cell carcinoma and method for making same. 4,053,586, Cl. 424-95.000.

Marconi, Walter: *See*—
Giongo, Matteo; Marconi, Walter; Palladino, Nicola; and Di Gregorio, Francesco, 4,053,521, Cl. 260-618.00H.

Marino, Armando V.: *See*—
Maskell, Roy; and Marino, Armando V., 4,052,776, Cl. 29-25.110.

Marlor, Guy A., to Varian Associates, Inc. Electrophotographic imaging method. 4,053,309, Cl. 96-1.0TE.

Marlor, Guy A., to Varian Associates, Inc. Electrophotographic photoconductive plate and the method of making same. 4,053,863, Cl. 338-15.000.

Marquis, Edward T.; and Watts, Lewis W., Jr., to Texaco Development Corporation. Barium nitride catalysts for the preparation of diaminodiphenylmethanes. 4,053,513, Cl. 260-570.00D.

Marsh, Richard O., Jr. Double sleeve pipe coupler. 4,053,247, Cl. 403-279.000.

Marshall, Hamilton W., Jr.: *See*—
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Marshall, James R.: *See*—
Katz, Leonard R.; Marshall, James R.; and Desmarchais, Walter E., 4,053,067, Cl. 214-18.00N.

Martel, Jacques; Heymes, Rene; and Lutz, Andre, to Roussel-UCLAF. Hydroxy-phenylacetamido cephalosporin compositions and method of use. 4,053,597, Cl. 424-246.000.

Martelet, Ronald G., to Sears, Roebuck and Co. Combination rear luggage carrier and child seat for bicycle. 4,053,091, Cl. 224-32.00A.

Martens, Guy, to Solvay & Cie. Process for the manufacture of vinylidene fluoride. 4,053,529, Cl. 260-653.500.

Martin, Fred David: *See*—
Adams, Sally Lee; Cook, Michael M.; and Martin, Fred David, 4,053,323, Cl. 106-100.000.

Martin, Stephen M.: *See*—
Hose, R. Kenneth, Jr.; Riordan, Keith; and Martin, Stephen M., 4,053,821, Cl. 363-60.000.

Maruo, Tsunehiro, to Sony Corporation. Apparatus for detecting the direction of a magnetic field to sense the position of, for example, a rotary element or the like. 4,053,829, Cl. 324-46.000.

Marushima, Giichi: *See*—
Tanaka, Hiroshi; Takahashi, Shinkichi; Takahashi, Touru; Tsukada, Shusei; and Marushima, Giichi, 4,053,770, Cl. 250-324.000.

Maruyama, Hiroshi; and Watanabe, Masashi, to Horiba, Ltd. Liquid junction of reference electrode. 4,053,382, Cl. 204-195.00F.

Marvin Glass & Associates: *See*—
Breslow, Jeffrey D.; and Jaworski, Eugene, 4,053,158, Cl. 273-135.00R.

Marx, Gunter Helmut, to Dr. Eduard Fresenius Chemisch-Pharmazeutische Industrie KG. Blood filter. 4,053,420, Cl. 210-435.000.

Marx, Ralph J.: *See*—
Golembeck, Gerald A.; and Marx, Ralph J., 4,052,760, Cl. 5-248.000.

Masch, Helmut E. W.: *See*—
Morse, Hugh B.; Johnson, Robert B.; and Masch, Helmut E. W., 4,052,931, Cl. 93-36.010.

Maschinenfabrik Carl Zangs Aktiengesellschaft: *See*—
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Maskell, Roy; and Marino, Armando V., to Zenith Radio Corporation. Method of spot-knocking an electron gun assembly in a color television picture tube. 4,052,776, Cl. 29-25.110.

Mast, Aquila D.: *See*—
Rice, Robert L.; and Mast, Aquila D., 4,052,841, Cl. 56-341.000.

Mast, John George, Jr., to Procter & Gamble Company, The. Disposable product applicator and dispensing package therefor. 4,053,242, Cl. 401-6.000.

Masuda, Kenzo, to Hitachi, Ltd. Logic circuit of ratioless structure. 4,053,791, Cl. 307-205.000.

Material Control, Inc.: *See*—
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Mathison, Paschal S., to Photographic Equipment Service, Inc. Apparatus for optically copying small film images with good resolution. 4,053,220, Cl. 355-45.000.

Matsumoto, Mitsuo, to Tokyo Shibaura Electric Co., Ltd. Numerical control system for lathes. 4,053,819, Cl. 318-636.000.

Matsumoto, Osamu, to Rank Xerox, Ltd. Sheet feeding device. 4,053,152, Cl. 271-9.000.

Matsumoto, Seiichi: *See*—
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Matsuno, Isao: *See*—
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Matsushima, Masaaki: *See*—
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Matsushita Electric Industrial Co., Ltd.: *See*—
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Minami, Shunji, 4,053,799, Cl. 307-351.000.
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Matsushita Electronics Corporation: *See*—
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Matsuyama, Kiyoshi: *See*—
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Matsuzawa, Toshiaki: *See*—
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Mattel, Inc.: *See*—
Crain, Philip Warren; Gabler, Otto Leonhard; and Kilroy, Eugene Joseph, Jr., 4,052,813, Cl. 46-119.000.

Mattson, Arne J., to Paul Anderson Industrier AB. Method of lifting or lowering an object by means of a plurality of so-called climbing jacks. 4,053,138, Cl. 254-105.000.

Mattsson, Mats Orjan: *See*—
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Mauz, Otto: *See*—
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Mawhinney, Daniel David: *See*—
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Mayer, Norbert: *See*—
Fischer, Edgar; Mauz, Otto; Mayer, Norbert; and Pfahler, Gerhard, 4,053,541, Cl. 260-937.000.

Mayer, William B.: *See—*
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McArthur, Dennis P., to Union Oil Company of California. Exhaust gas conversion catalyst. 4,053,434, Cl. 252-432.000.
McCandless, William; Leu, Robert F.; Kroder, Ernest A.; and Tomecek, Charles J., to Dentsply Research & Development Corporation. Automatic bur grinding machine. 4,052,821, Cl. 51-53.000.
McCarthy, Daniel J.: *See—*
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McCarthy, Edward P., to U.S. Expansion Bolt Company. Expansion stud. 4,052,925, Cl. 85-77.000.
McCawley, Frank X.: *See—*
Schlain, David; McCawley, Frank X.; and Smith, Gerald R., 4,053,377, Cl. 204-106.000.
McCloskey, Albert R., to Heim Universal Corporation, The. Self-aligning bearing with a split inner member. 4,053,190, Cl. 308-72.000.
McCluney, William R., to United States of America, National Aeronautics and Space Administration. 2°/90° Laboratory scattering photometer. 4,053,229, Cl. 356-103.000.
McClure, James D.; and Neumann, Friedrich E., to Shell Oil Company. Preparation of bisphenols. 4,053,522, Cl. 260-619.00A.
McClure, Randall D., to Caterpillar Tractor Co. Step assembly for construction vehicles. 4,053,172, Cl. 280-163.000.
McCombie, Stuart W.: *See—*
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McCullum, R. Gene: *See—*
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McDiarmid, Michael D.: *See—*
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McDonald, Raymond F., to J. I. Case Company. Self-actuating brake linkage. 4,053,032, Cl. 188-77.00R.
McEvoy Oilfield Equipment Co.: *See—*
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McGibbon, Gregor D.: *See—*
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McGourty, Thomas K. Serial wire matrix printer. 4,053,040, Cl. 197-1.00R.
McKissack, Patrick G., to Anderson Company, The. Motor-driven bolster plate. 4,052,919, Cl. 83-205.000.
McMahon, Floyd: *See—*
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McMills, Corey John: *See—*
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McMullen, Warren H.; and Mooney, Thomas J., to M & T Chemicals Inc. Electroplating of nickel, cobalt, nickel-cobalt, nickel-iron, cobalt-iron and nickel-iron-cobalt deposits. 4,053,373, Cl. 204-43.00T.
McNeill, William H.: *See—*
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McRowe, Arthur Watkins; and Kroenke, William Joseph, to B. F. Goodrich Company, The. Vinyl halide polymers having improved resistance to burning and smoke formation. 4,053,453, Cl. 260-45.75C.
McRowe, Arthur Watkins: *See—*
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Means, Richard E.: *See—*
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Measurex Corporation: *See—*
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Meehan, James E.: *See—*
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Mehrhof, Werner: *See—*
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Mehrmann, Fritz: *See—*
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Meji Seika Kaisha Ltd.: *See—*
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Moller, Eike; Meng, Karl, deceased; Horstmann, Harald; Seuter, Friedel; and Wehinger, Egbert, 4,053,621, Cl. 424-273.00P.
Meng, Karl, deceased: *See—*
Moller, Eike; Meng, Karl, deceased; Horstmann, Harald; Seuter, Friedel; and Wehinger, Egbert, 4,053,621, Cl. 424-273.00P.
Mercier, Georges, to Entreprise de Recherches et d'Activites Petrolieres (E.R.A.P.). Device for guiding a drilling string during underwater drilling. 4,053,022, Cl. 175-5.000.
Merck & Co., Inc.: *See—*
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Weinstock, Leonard M., 4,053,286, Cl. 544-21.000.
Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
Schacht, Erich; Mehrhof, Werner; Nowak, Herbert; Simane, Zdenek; and Kayser, Detlev, 4,053,626, Cl. 424-275.000.
Merker, Reuven; and Lucca, Salvatore, to Metalux Corporation, The. Purification of nickel and cobalt electroplating solutions. 4,053,400, Cl. 204-49.000.
Merkl. George G. Aluminum halohydrate. 4,053,570, Cl. 423-462.000.
Merz, Kenneth M.; and Shapiro, Howard E., to TRW Inc. Electrical resistor with novel termination and method of making same. 4,053,866, Cl. 338-309.000.
Metallgesellschaft Aktiengesellschaft: *See—*
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Meudec, Alain. Rollers for use in printing and method of making same. 4,052,777, Cl. 29-120.000.
Meulenberg, Andrew, Jr., to Communications Satellite Corporation. Light concentrating solar cell cover. 4,053,327, Cl. 136-89.0CC.
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, to Bayer Aktiengesellschaft. 1,2-Pentamethylene-1,4-dihydropyridine derivatives. 4,053,614, Cl. 424-266.000.
Meyer, Jeffry R., to Westinghouse Electric Corporation. Coupling flex-plate construction for gas-insulated transmission lines. 4,053,700, Cl. 174-21.00C.
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Meylan, Jean-Luc Ch.: *See—*
Courvoisier, Jean-Claude F.; Meylan, Jean-Luc Ch.; Gross, Daniel M.; and Fournier, Jacques Pierre D., 4,053,368, Cl. 203-10.000.
Michaelis, Maximilian Gustav Alfred Cecil. Translucent building blocks. 4,053,210, Cl. 350-262.000.
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Micklewright, Donald G.: *See—*
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Mikolas, Eugene A., to Xerox Corporation. Development system. 4,053,218, Cl. 355-15.000.
Milberger, Lionel John; and Zimmer, Richard Allen, to British Petroleum Company Limited, The. Method and apparatus for determining strain data during piling. 4,052,884, Cl. 73-12.000.
Miles, John J., Jr.: *See—*
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Milito, Richard A.: *See—*
Cochran, C. Norman; Das, Subodh K.; and Milito, Richard A., 4,053,303, Cl. 75-68.00A.
Miller, Charles Leroy; and Ledebur, Harry Calhoon, to Wean United, Inc. Crank drive system for cold pilger mills drive or the like. 4,052,898, Cl. 72-214.000.
Miller, George A.; and Lewis, Sheldon N., to Rohm and Haas Company. Certain 3-alkoxyisothiazole-4-carboxylic acids and derivatives thereof. 4,053,479, Cl. 260-302.00A.
Miller, Georges Michel: *See—*
Millette, Louis Guy; Murphy, Peter; Miller, Georges Michel; and Tyszewicz, Wieslaw Josef, 4,053,827, Cl. 324-34.0TK.
Miller, Glenn E., to Goodyear Tire & Rubber Company, The. Production of para-dialkylbenzene dihydroperoxide. 4,053,520, Cl. 260-610.00A.
Miller, John M. Apparatus for removing particles from water for sprinklers and the like. 4,053,413, Cl. 210-104.000.
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Cullinan, Robert L.; Jay, Ronald W.; Beck, Keith; and Miller, Lloyd J., 4,052,880, Cl. 72-326.000.
Miller, Robert Lynn; and Weisshappel, Robert Neal, to Motorola, Inc. Dual modulus programmable counter. 4,053,739, Cl. 364-703.000.
Miller, Stewart Edward, to Bell Telephone Laboratories, Incorporated. Optical fiber having reduced dispersion. 4,053,204, Cl. 350-96.0GN.
Miller, Stewart Edward, to Bell Telephone Laboratories, Incorporated. Optical fiber having reduced dispersion. 4,053,205, Cl. 350-96.0GN.
Millette, Louis Guy; Murphy, Peter; Miller, Georges Michel; and Tyszewicz, Wieslaw Josef, to Northern Telecom Limited. Apparatus for measuring, and indicating, the thickness of a non-metallic coating on an arcuate metal surface. 4,053,827, Cl. 324-34.0TK.
Minami, Shunji, to Matsushita Electric Industrial Co., Ltd. Voltage memory device. 4,053,799, Cl. 307-351.000.
Mine Safety Appliances Company: *See—*
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Bub, Robert A., 4,052,922, Cl. 83-639.000.
Mineral & Chemical Resource Co.: *See*—
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Minke, Charles M., to United States of America, Navy. Reinforced filament-wound cut-port pressure vessel and method of making same. 4,053,081, Cl. 220-3.000.
Minnesota Mining and Manufacturing Company: *See*—
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Lee, Pui Kum, 4,053,433, Cl. 252-408.000.
Ward, John R., 4,052,935, Cl. 101-11.000.
Minolta Camera Kabushiki Kaisha: *See*—
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Minter, Thomas F.: *See*—
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Mitchell, Thomas Owen; and Whitehurst, Darrell Duayne, to Mobil Oil Corporation. Organic compound conversion. 4,053,534, Cl. 260-683.15R.
Mitsubishi Chemical Industries Ltd.: *See*—
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Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Hiramatsu, Takeo; and Fujita, Yasuhiko, 4,052,930, Cl. 91-446.000.
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Miyake, Takao; and Koashi, Katsue, to Kurashiki Boseki Kabushiki Kaisha. Method and apparatus for counting yarn-splicing operations of spindles in automatic winding machine. 4,053,114, Cl. 242-36.000.
Miyata, Junjiro; and Kikuchi, Yasushi, to Asahi Breweries, Ltd. Method of obtaining lupulin-rich products from hops. 4,053,653, Cl. 426-481.000.
Miyata, Minoru: *See*—
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Mizunuma, Tokuichi; Yamazoe, Hisamitsu; and Matsuno, Isao, to Fuji Jukogyo Kabushiki Kaisha. Internal combustion engine. 4,052,972, Cl. 123-191.00R.
Mizushima, Masashi: *See*—
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Mo och Domsjo Aktiebolag: *See*—
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Mobay Chemical Corporation: *See*—
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Mobil Oil Corporation: *See*—
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Heiba, El-Ahmadi I.; Kinney, Robert E.; and Stead, George E., 4,053,425, Cl. 252-33.000.
Ireland, Henry R.; and Stein, Thomas R., 4,053,532, Cl. 260-676.00R.
Mitchell, Thomas Owen; and Whitehurst, Darrell Duayne, 4,053,534, Cl. 260-683.15R.
Vandor, Robert Joseph, 4,053,549, Cl. 264-293.000.
Moeglich, Karl; and Hodgetts, Graham L., to Westinghouse Electric Corporation. Water purification method and apparatus. 4,053,378, Cl. 204-149.000.
Moen, Lowell J.; Helton, Eugene L.; and Straesser, Chris R., to Caterpillar Tractor Co. Ground-engaging tool with wear-resistant insert. 4,052,802, Cl. 37-141.00R.
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Mohaupt, Udo H., to Institute of Gas Technology. Thrust generator. 4,052,850, Cl. 60-327.000.
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Hersey, William Hugh, Jr., 4,053,937, Cl. 360-77.000.
Moise, Norton L.: *See*—
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Molins Limited: *See*—
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Moller, Eike; Meng, Karl, deceased (by Meng, Ilse Heide Frieda, heir); Horstmann, Harald; Seuter, Friedel; and Wehinger, Egbert, to Bayer Aktiengesellschaft. 1-[2-(β Naphthyloxy)ethyl]-3-methylpyrazolone-(5) and antithrombotic and antithrombolytic compositions and methods utilizing them. 4,053,621, Cl. 424-273.00P.
Momiyama, Kikuo, to Canon Kabushiki Kaisha. Focus adjusting device for telephotographic lens. 4,053,211, Cl. 350-255.000.
Monahan, John F., to Harris Corporation. Automatic centering. 4,053,203, Cl. 358-51.000.
Monarch Marking Systems, Inc.: *See*—
Hamisch, Paul H., Jr., 4,053,345, Cl. 156-384.000.
Kirby, Raymond L., 4,052,938, Cl. 101-291.000.
Pabodie, Robert M., 4,052,936, Cl. 101-93.070.
Monsanto Company: *See*—
Chen, Gilbert K. C.; and Crosby, Lincoln B., 4,053,290, Cl. 55-187.000.
Donermeyer, Donald D., 4,053,682, Cl. 428-460.000.
Dutra, Gerard A., 4,053,505, Cl. 260-502.500.
Howe, Robert K., 4,053,501, Cl. 560-103.000.
Monsanto Research Corporation: *See*—
Garner, Albert Y., 4,053,560, Cl. 423-302.000.
Mooney, Thomas J.: *See*—
McMullen, Warren H.; and Mooney, Thomas J., 4,053,373, Cl. 204-43.00T.
Moore, Jesse C., to J. C. Moore Research, Inc. Fuel induction system for internal combustion engines. 4,053,544, Cl. 261-145.000.
Moore, John Howard, to Lucas Electrical Company Limited, The. Corona discharge fluid flow transducers and fuel injection systems incorporating such transducers. 4,052,964, Cl. 123-32.0EJ.
Moore-McCormack Energy, Inc.: *See*—
Bailey, Angus B., 4,053,388, Cl. 208-89.000.
Morello, Tomaso: *See*—
Thillet, Antoine; and Morello, Tomaso, 4,052,769, Cl. 17-23.000.
Mori, Fumio: *See*—
Fujita, Yoshiji; Omura, Yoshiaki; Mori, Fumio; Itoi, Kazuo; Nishida, Takashi; Tamai, Yoshin; Aihara, Sukeji; Hosogai, Takeo; and Wada, Fumio, 4,053,380, Cl. 204-163.00R.
Morisawa, Yasuhiro; Kataoka, Mitsuru; Kitano, Noritoshi; and Matsuzawa, Toshiaki, to Sankyo Company Limited. Compositions and methods for the treatment of coccidiosis. 4,053,608, Cl. 424-266.000.
Morita, Yasuo: *See*—
Tatara, Seiji; Morita, Yasuo; Nishonomiya, Makoto; and Kumoda, Masashi, 4,053,429, Cl. 252-187.00H.
Moritz, Jules G.: *See*—
Haning, James O.; Kool, Bram; Moritz, Jules G.; and Mizrahi, Robert, 4,053,215, Cl. 353-116.000.
Morohashi, Hisao, to Ohno Research & Development Laboratories Co. Portable copier. 4,053,225, Cl. 355-115.000.
Morris, Charles S., to Caterpillar Tractor Co. Engine cooling system vent means. 4,052,965, Cl. 123-41.050.
Morris, Kent C.: *See*—
Bonsen, Pieter; Laver, Myron B.; and Morris, Kent C., 4,053,590, Cl. 424-177.000.
Morrison, Gordon MacRitchie. Hand scrubber. 4,052,766, Cl. 15-21.00C.
Morriss, Harry Augustus: *See*—
Williamson, John Peter Hugh; and Morriss, Harry Augustus, 4,053,320, Cl. 106-57.000.
Morrow, Scott I., to United States of America, Army. Production of electroless metal coatings on nitrocellulose base propellants and article. 4,052,941, Cl. 102-39.000.
Morse, Hugh B.; Johnson, Robert B.; and Masch, Helmut E. W., to Masch, Helmut E. W. Method and apparatus for lining containers. 4,052,931, Cl. 93-36.010.
Morton, Douglas R., Jr., to Upjohn Company, The. Tricyclic prostaglandin intermediates. 4,053,485, Cl. 260-340.700.
Moseman, Paul W., Jr.; and Hart, Russell F., to Bendix Corporation, The. Static friction free altimeter. 4,052,902, Cl. 73-387.000.
Moser, Robert; Steinegger, Alfred; Dolder, Fritz; and Feddern, Horst, to Swiss Aluminium Ltd. Device for introduction of gases into reaction vessels containing fluids. 4,053,147, Cl. 266-220.000.
Moss, Robert H.; and Spicuzza, William F., to Harshaw Chemical Company, The. Process for preparing essentially pure barium fluoride crystals. 4,053,572, Cl. 423-490.000.
Motorola, Inc.: *See*—
Bitter, Charles Raymond, Jr.; and Malcolm, Robert Bruce, 4,053,896, Cl. 343-709.000.
Cave, David L., 4,053,915, Cl. 357-22.000.
Galvin, Lee Robert, 4,053,943, Cl. 361-399.000.
Havens, Richard Calvin, 4,053,854, Cl. 331-101.000.
Johnson, Robert H., 4,053,889, Cl. 343-17.2PC.
Kang, S. Daniel, 4,053,923, Cl. 357-51.000.
Miller, Robert Lynn; and Weisshappel, Robert Neal, 4,053,739, Cl. 364-703.000.
Ryan, Carl R.; and Stilwell, James H., 4,053,837, Cl. 325-323.000.
Wright, Larry Richard; and Cohlman, Donald Charles, 4,053,843, Cl. 325-479.000.
Mouille, Rene Louis, to Societe Nationale Industrielle Aerospatiale. Tail-rotor arrangement for rotor crafts. 4,053,258, Cl. 416-134.00A.

Mount, Ralph W. Improved process for providing offset bends of the correct dimension in pipe and the like. 4,052,881, Cl. 72-459.000.

MTU Motoren-Und Turbinen Union Munchen GmbH: *See*—
Pennig, Gregor, 4,053,261, Cl. 416-244.00A.

Mucciardi, Anthony N.; and Shankar, Ramesh, to Adaptronics, Inc. System for measurement of subsurface fatigue crack size. 4,052,889, Cl. 73-67.80S.

Mueller, Norbert: *See*—
Hoffmann, Werner; Mueller, Norbert; and Paust, Joachim, 4,053,511, Cl. 260-563.00P.

Mues, Volker; and Niggemann, Johannes, to Bayer Aktiengesellschaft. Ferrocene derivative for supplying plants with iron. 4,053,296, Cl. 71-1.000.

Muhlbauer, Richard: *See*—
Kleiner, Frank Gerald; Radojewski, Hans; Muhlbauer, Richard; and Muller, Karl-Heinz, 4,053,341, Cl. 156-79.000.

Muller, Karl-Heinz: *See*—
Kleiner, Frank Gerald; Radojewski, Hans; Muhlbauer, Richard; and Muller, Karl-Heinz, 4,053,341, Cl. 156-79.000.

Munch, Erich; and Gnida, Bernd, to Varta Batterie Aktiengesellschaft. Pole bolt seal for galvanic cells. 4,053,693, Cl. 429-183.000.

Munier, Alfred E.: *See*—
Donnelly, Lawrence A.; Flocke, Leland C.; Himel, Victor H.; Mikals, John J.; Munier, Alfred E.; and Slote, Lawrence, 4,053,399, Cl. 210-44.000.

Munstedt, Wolfgang: *See*—
Berger, Heinz Otto; and Munstedt, Wolfgang, 4,053,777, Cl. 250-380.000.

Murakami, Masayuki: *See*—
Yoshioka, Mitsuru; Murakami, Masayuki; and Sendo, Yuji, 4,053,469, Cl. 544-21.000.

Muramoto, Shoichi: *See*—
Aozuka, Torao; Ohkoshi, Akio; Muramoto, Shoichi; Nakayama, Akira; and Sumi, Koichiro, 4,053,807, Cl. 313-409.000.

Murata, Tomoji; and Maese, Masayuki, to Minolta Camera Kabushiki Kaisha. Temperature control device. 4,053,733, Cl. 219-494.000.

Murphy, Peter: *See*—
Millette, Louis Guy; Murphy, Peter; Miller, Georges Michel; and Tyszewicz, Wieslaw Josef, 4,053,827, Cl. 324-34.0TK.

Murphy, Robert P.; and Owens, Wiliam W., to Standard Oil Company (Indiana). Measuring reservoir oil saturation. 4,052,893, Cl. 73-155.000.

Murzin, Horst; and Grygo, Gunter, to Veb Schraubenkombinat. Apparatus for continuous pressing of bolts, screw blanks or similar parts. 4,052,873, Cl. 72-185.000.

Musebeck, Horst: *See*—
Diepers, Heinrich; Schmidt, Otto; and Musebeck, Horst, 4,052,784, Cl. 29-599.000.

Myers, Harold Edward, to Heath Company. Power line switch with time delay turn off. 4,053,790, Cl. 307-141.400.

Myers, Kenneth R.: *See*—
Jorgensen, Stanley A.; and Myers, Kenneth R., 4,053,179, Cl. 296-28.00C.

Naab, Donald Carl: *See*—
Baron, David Alan; Naab, Donald Carl; and Hampton, James Ronald, 4,053,730, Cl. 219-10.55F.

Nabisco, Inc.: *See*—
Lynch, Joseph A., 4,053,066, Cl. 214-7.000.

Nachod, Frederick C.: *See*—
Eustis, Frederic A., III; Gorman, William G.; and Nachod, Frederick C., 4,053,636, Cl. 424-326.000.

Nadeau, Raymond R.; and Wyman, John E., to Itek Corporation. Hydrophilizing composition for lithographic printing plates. 4,053,319, Cl. 106-2.000.

Nafziger, Ralph H.; and Blake, Henry E., Jr., to United States of America, Interior. Synthetic fluorspar for conditioning electric furnace slags. 4,053,302, Cl. 75-11.000.

Nagaoka, Shinji: *See*—
Saito, Takeo; Takazawa, Yuzuru; Nagaoka, Shinji; and Seki, Yoichi, 4,053,908, Cl. 354-31.000.

Nagy, Edward John: *See*—
Orkin, Stanley S.; and Nagy, Edward John, 4,053,665, Cl. 427-385.00C.

Nahay, Lawrence P., to United States of America, Navy. Solid state two-wire/four-wire converter with common battery. 4,053,722, Cl. 179-170.0NC.

Naka, Kiyomi; and Oe, Michisuke, to Teijin Limited. Light-sensitive composition. 4,053,317, Cl. 96-115.00P.

Nakada, Kazuhiko: *See*—
Chino, Jiro; and Nakada, Kazuhiko, 4,053,650, Cl. 426-304.000.

Nakajima, Kazuo, to Xenoah Co. Internally accommodated speed change mechanism applicable to a bicycle, etc. 4,052,914, Cl. 74-750.00B.

Nakamoto, Soichi: *See*—
Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Nakamoto, Soichi, 4,053,909, Cl. 354-105.000.

Nakamura, Tokuro: *See*—
Yoshimura, Shoji; Takahashi, Susumu; Ichino, Motonobu; and Nakamura, Tokuro, 4,053,466, Cl. 542-454.000.

Nakase, Takamichi: *See*—
Hattori, Tadashi; Takada, Shigetaka; Sugi, Fumio; and Nakase, Takamichi, 4,052,968, Cl. 123-119.0EC.

Nakata, Kiichi, legal successor: *See*—
Watabe, Yoji; Ishii, Michio; Iseda, Yutaka; Komatsu, Kouei; Ohshima, Noboru; and Nakata, Yozo, deceased, 4,053,446, Cl. 260-37.00N.

Nakata, Yozo, deceased: *See*—
Watabe, Yoji; Ishii, Michio; Iseda, Yutaka; Komatsu, Kouei; Ohshima, Noboru; and Nakata, Yozo, deceased, 4,053,446, Cl. 260-37.00N.

Nakatsui, Hisashi: *See*—
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, 4,053,898, Cl. 346-1.000.

Nakauchi, Shunsaku; and Takahashi, Akifusa, to Kokusai Gijutsu Kaihatsu Kabushiki Kaisha. Electric lock system. 4,053,939, Cl. 361-171.000.

Nakayama, Akira: *See*—
Aozuka, Torao; Ohkoshi, Akio; Muramoto, Shoichi; Nakayama, Akira; and Sumi, Koichiro, 4,053,807, Cl. 313-409.000.

Napoli, Louis Sebastian: *See*—
Rosen, Arye; and Napoli, Louis Sebastian, 4,053,841, Cl. 329-103.000.

Narayanan, Venkatachala L.: *See*—
Hauck, Frederic Peter; Reid, Joyce; Narayanan, Venkatachala L.; Cimarusti, Christopher M.; Haugwitz, Rudiger D.; and Sundeen, Joseph E., 4,053,596, Cl. 424-244.000.

Narayanan, Venkatachala Lakshmi: *See*—
Rovnyak, George C.; Narayanan, Venkatachala Lakshmi; and Haugwitz, Rudiger D., 4,053,613, Cl. 424-246.000.

National Marine Service, Inc.: *See*—
in't Veld, Cornelis, 4,053,414, Cl. 210-117.000.

National Petro Chemicals Corporation: *See*—
Krekeler, Jerome H.; Kirch, William; and Aboutboul, Henri A., 4,053,565, Cl. 423-338.000.

National Research Development Corporation: *See*—
Allison, Anthony Clifford; and Gregoriadis, Gregory, 4,053,585, Cl. 424-92.000.

National Semiconductor Corporation: *See*—
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National Steel Corporation: *See*—
Hass, Winfield M.; Niehaus, Howard E.; and Pack, James L., 4,053,059, Cl. 212-18.000.

National Union Electric Corporation: *See*—
Backlund, John R., 4,053,690, Cl. 429-112.000.

NCR Corporation: *See*—
Advani, Jeram G.; Paganini, Bruno J.; and Hale, William J., 4,053,710, Cl. 179-1.0SB.

Neathery, John L., Jr.: *See*—
Hudspeth, Emmett L.; Richardson, Philip C.; Neathery, John L., Jr.; Dykstra, Jerald P.; Boger, Allen D., Jr.; Sims, William B., Jr.; Hunt, Glenn E.; and Quisenberry, Tony M., 4,053,951, Cl. 364-415.000.

Nebelsiek, Hilbert J.: *See*—
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Nebiker, Arthur W.; and Yanofsky, Daniel N., to Pitney-Bowes, Inc. Document platen cover for photocopy machine. 4,053,223, Cl. 355-75.000.

Neff, Edward C.; and Spicer, Howard F., to Westinghouse Electric Corporation. Finned tube coil. 4,053,014, Cl. 165-150.000.

Neiman S. A.: *See*—
Weber, Gunter, 4,052,869, Cl. 70-252.000.

Nelson, Carl T., to National Semiconductor Corporation. A.C. power meter. 4,053,832, Cl. 324-142.000.

Nelson, Rodney L., to Baughman, Ray M., a part interest. Mining method and apparatus. 4,053,182, Cl. 299-19.000.

Nerheim, Eldon, to Honeywell Inc. Microwave element including source antenna and cavity portions. 4,053,897, Cl. 343-785.000.

Nesbitt, Leroy E. Buckle. 4,052,773, Cl. 24-163.00K.

Ness, Phillip D.; and Long, Robert A., to General Electric Company. Apparatus and method for precision overboring an arcuate, variable diameter bore. 4,053,249, Cl. 408-1.0BD.

Netzbandt, William: *See*—
Pader, Morton; Miles, John J., Jr.; and Netzbandt, William, 4,053,581, Cl. 424-68.000.

Neumann, Friedrich E.: *See*—
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Neumann, Peter: *See*—
Eichenberger, Erwin; and Neumann, Peter, 4,053,617, Cl. 424-270.000.

Neumeyer, John Leopold; and Tenthorey, Paul Andre, to Astra Pharmaceutical Products, Inc. Benzylisoquinoline derivatives, and use as anti-arrhythmic drugs. 4,053,603, Cl. 424-258.000.

Newman, Alec Thomas: *See*—
Lack, Bryan Edward Charles; and Newman, Alec Thomas, 4,053,087, Cl. 222-278.000.

Newman, Ferris E., to Baxter Travenol Laboratories, Inc. Embossed support member with high and low skip ribs. 4,053,417, Cl. 210-321.00B.

Newman, Ferris E., to Baxter Travenol Laboratories, Inc. Embossed membrane support. 4,053,418, Cl. 210-321.00B.

Nichireki Chemical Inudstry Co., Ltd: *See*—
Fukushima, Fumiaki; Sugita, Tasuku; Kobayashi, Kohei; Asada, Hiroshi; and Onishi, Arata, 4,053,401, Cl. 210-52.000.

Nicholson, John Stuart: *See*—
Adams, Stewart Sanders; Armitage, Bernard John; Nicholson, John Stuart; and Blancafort, Antonio Ribera, 4,053,639, Cl. 424-343.000.

Niebrzydoski, John L., to ACF Industries, Inc. Control means for secondary throttle. 4,053,542, Cl. 261-23.00A.

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Niemann, Henry P. Homicide board game. 4,053,154, Cl. 273-134.00B.
Niemi, Antti Johannes. Method for controlling the pH and other concentration variables. 4,053,743, Cl. 364-500.000.
Niertit, Frank; and Rimlinger, Donald C., to Stromberg-Carlson Corporation. Air-fuel ratio control system utilizing oxygen sensor and pressure differential sensor. 4,052,970, Cl. 123-139.0AW.
Nife Jungner AB: *See*—
Reinhardt, Hans; Ottertun, Harald Daniel; and Rydberg, Jan Helge Arnold, 4,053,553, Cl. 423-105.000.
Niggemann, Johannes: *See*—
Mues, Volker; and Niggemann, Johannes, 4,053,296, Cl. 71-1.000.
Nimmersjo, Gunnar, to ASEA Aktiebolag. Protection means for objects included in electrical power supply networks. 4,053,816, Cl. 361-62.000.
Nippon Electric Company, Ltd.: *See*—
Enomoto, Osamu, 4,053,716, Cl. 179-18.0GF.
Tomita, Yuichi; Irabu, Takeru; and Kiuchi, Eiichi, 4,053,885, Cl. 343-7.700.
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Sato, Akihiko, 4,053,913, Cl. 354-244.000.
Shimomura, Jun, 4,053,911, Cl. 354-152.000.
Nippon Paint Co., Ltd.: *See*—
Oka, Shoji; Sobata, Tamotsu; Kishimoto, Teturo; and Nobe, Kazuo, 4,053,328, Cl. 148-6.15Z.
Nippon Soda Company, Limited: *See*—
Tatara, Seiji; Morita, Yasuo; Nishonomiya, Makoto; and Kumoda, Masashi, 4,053,429, Cl. 252-187.00H.
Nippon Soken, Inc.: *See*—
Hattori, Tadashi; Takada, Shigetaka; Sugi, Fumio; and Nakase, Takamichi, 4,052,968, Cl. 123-119.0EC.
Shinoda, Yoshio; and Kuno, Akira, 4,053,749, Cl. 364-424.000.
Nippon Steel Corporation: *See*—
Yoshiwara, Seishiro; Kawaharada, Minoru; and Yanagimoto, Samon, 4,052,874, Cl. 72-209.000.
Nippondenso Co., Ltd.: *See*—
Kato, Masumi; Kanazawa, Shigenori; and Oshikawa, Kiyomitsu, 4,053,175, Cl. 280-745.000.
Nishida, Takashi: *See*—
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Nishikawa, Kazuo, to Pioneer Electronic Corporation. Piezoelectric type pickup cartridge for stereo with pressing and intermediate members for coupling. 4,053,721, Cl. 179-100.41K.
Nishikawa, Masaji; and Kasuga, Muneo, to Olympus Optical Company Limited. Corona charge device. 4,053,769, Cl. 250-324.000.
Nishioka, Toshio: *See*—
Ono, Isao; Okuno, Yoshitoshi; Nishioka, Toshio; and Itaya, Nobushige, 4,053,625, Cl. 424-274.000.
Nishonomiya, Makoto: *See*—
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Wasawa, Kiyoshi; Kita, Toru; Sugisaki, Takao; and Higurashi, Minoru, 4,053,826, Cl. 324-34.00D.
Nissan Motor Co., Ltd.: *See*—
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Nobe, Kazuo: *See*—
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Noe, Werner, to Siemens Aktiengesellschaft. Digital signal level comparison device. 4,053,870, Cl. 340-146.200.
Norden, Alexander R. Lay-in connectors. 4,053,202, Cl. 339-272.0UC.
Nordengren Patenter AB: *See*—
Nordengren, Rolf Gunnar Jonas, 4,053,407, Cl. 210-74.000.
Nordengren, Rolf Gunnar Jonas, to Nordengren Patenter AB. Method for distributing a sludge to be filtered over the upper surface of the filter cloth of a rotating belt filter. 4,053,407, Cl. 210-74.000.
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Northern Telecom Limited: *See*—
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Millette, Louis Guy; Murphy, Peter; Miller, Georges Michel; and Tyszewicz, Wieslaw Josef, 4,053,827, Cl. 324-34.0TK.
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Nowak, Herbert: *See*—
Schacht, Erich; Mehrhof, Werner; Nowak, Herbert; Simane, Zdenek; and Kayser, Detlev, 4,053,626, Cl. 424-275.000.
Obear, Robert F., to Western Gear Corporation. Method and apparatus for abrasively cutting objects. 4,052,822, Cl. 51-88.000.
Occidental Petroleum Company: *See*—
Bradford, James L.; and Ore', Fernando, 4,053,564, Cl. 423-321.00S.
Occidental Research Corporation: *See*—
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Ogawa, Akira: *See*—
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Ogawa, Mutsuo, to Ricoh Co., Ltd. Method and device for coding compressing video information. 4,053,930, Cl. 358-133.000.
Ogilvie, LeRoy F.; and Hartig, Henry F., to GF Business Equipment, Inc. Grommet assembly for furniture articles. 4,053,701, Cl. 174-48.000.
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Carnmalm, Bernt Sigfrid Emanuel; Lindberg, Ulf Henrik Anders; de Paulis, Tomas; Ross, Svante Bertil; Stjernstrom, Nils-Erik; Ulff, Carl Bengt Johan; and Ogren, Sven-Ove, 4,053,637, Cl. 424-330.000.
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Ohshima, Satoshi: *See*—
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Oka, Shoji; Sobata, Tamotsu; Kishimoto, Teturo; and Nobe, Kazuo, to Nippon Paint Co., Ltd. Zinc phosphate coating process. 4,053,328, Cl. 148-6.15Z.
Okamura, Yukio: *See*—
Yamashita, Keizo; Wada, Tatsuo; Okamura, Yukio; and Safranek, William H., 4,053,370, Cl. 204-13.000.
Oki Electric Industry Co., Ltd.: *See*—
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Okumiya, Masataro; and Ono, Takuro, to Asahi Glass Company Ltd. Heat fused refractory product containing zirconia having high corrosion resistance. 4,053,321, Cl. 106-57.000.
Okuno, Yoshitoshi: *See*—
Ono, Isao; Okuno, Yoshitoshi; Nishioka, Toshio; and Itaya, Nobushige, 4,053,625, Cl. 424-274.000.
Okuno, Youichi; and Yokota, Hideo, to Canon Kabushiki Kaisha. View finder system for a single lens reflex camera. 4,053,912, Cl. 354-225.000.
Olsen, Gregory Hammond; and Ban, Vladimir Sinisa, to RCA Corporation. Methods of defining regions of crystalline material of the group III-V compounds. 4,053,350, Cl. 156-659.000.
Olt, Arthur E., Jr.; and Vanrossem, Richard, to Caterpillar Tractor Co. Governor and decelerator control linkage. 4,052,910, Cl. 74-482.000.
Olympus Optical Company Limited: *See*—
Nishikawa, Masaji; and Kasuga, Muneo, 4,053,769, Cl. 250-324.000.
Omura, Yoshiaki: *See*—
Fujita, Yoshiji; Omura, Yoshiaki; Mori, Fumio; Itoi, Kazuo; Nishida, Takashi; Tamai, Yoshin; Aihara, Sukeji; Hosogai, Takeo; and Wada, Fumio, 4,053,380, Cl. 204-163.00R.
Ondetti, Miguel Angel; and Cushman, David W., to E. R. Squibb & Sons, Inc. Compounds and method for alleviating angiotensin related hypertension. 4,053,651, Cl. 424-319.000.
Onishi, Arata: *See*—
Fukushima, Fumiaki; Sugita, Tasuku; Kobayashi, Kohei; Asada, Hiroshi; and Onishi, Arata, 4,053,401, Cl. 210-52.000.
Ono, Hiroaki, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Anti-afterburn system. 4,052,848, Cl. 60-290.000.
Ono, Isao; Okuno, Yoshitoshi; Nishioka, Toshio; and Itaya, Nobushige, to Sumitomo Chemical Company, Limited. Insecticides. 4,053,625, Cl. 424-274.000.
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Ontario Tool Design Inc.: *See*—
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Opittek, Eugene W.; Heard, James L.; Keller, Bruce W.; Pruznick, Michael D.; and Bosseler, Thomas A., to Hughes Aircraft Company.

Modular programmable digital scan converter. 4,053,946, Cl. 364-200.000.

Opitz, Charles L., to Lockheed Electronics Company. Radar object detector using non-linearities. 4,053,891, Cl. 343-5.0SA.

Optical Radiation Corporation: *See—*
Wilkinson, John Nicholas, 4,053,759, Cl. 362-218.000.

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Teichner, Otwald; and Born, Manfred, 4,053,212, Cl. 351-32.000.

Orde, Hans-Otto Vom: *See—*
Betz, Helmut; Hidasi, Geza; and Orde, Hans-Otto Vom, 4,053,678, Cl. 428-369.000.

Ore', Fernando: *See—*
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Orkin, Stanley S.; and Nagy, Edward John, to Kamatics Corporation. Molded plastic bearing assembly. 4,053,665, Cl. 427-385.00C.

Ormsby, George S.: *See—*
Day, Roger W.; Ormsby, George S.; and Rich, Elvis, 4,053,393, Cl. 209-211.000.

Orth, Edward G.: *See—*
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Orton, Criley; and Bahler, Richard G., to United States of America, Navy. Edge detection analyzer. 4,053,928, Cl. 358-96.000.

Oshikawa, Kiyomitsu: *See—*
Kato, Masumi; Kanazawa, Shigenori; and Oshikawa, Kiyomitsu, 4,053,175, Cl. 280-745.000.

Ostrofsky, Bernard: *See—*
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Ostrowsky, Efrem M.: *See—*
Kelly, Ronald L.; and Ostrowsky, Efrem M., 4,053,090, Cl. 222-402.130.

Oswald, Alexis A., to Exxon Research & Engineering Co. Layered tetraalkyl phosphonium clays. 4,053,493, Cl. 260-448.00C.

Ottertun, Harald Daniel: *See—*
Reinhardt, Hans; Ottertun, Harald Daniel; and Rydberg, Jan Helge Arnold, 4,053,553, Cl. 423-105.000.

Oughton, Richard Walton: *See—*
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Outboard Marine Corporation: *See—*
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Owens-Illinois, Inc.: *See—*
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Brug, James E.; and Heidelberg, Eric X., 4,053,551, Cl. 423-21.000.
Ernsthausen, Roger E., 4,053,803, Cl. 313-201.000.
Taylor, Lynn J.; and Troy, Neal, 4,053,666, Cl. 428-35.000.

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Oxford Pendaflex Canada Limited: *See—*
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Ozeryansky, Gennady. Massage hoop. 4,052,982, Cl. 128-57.000.

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Dey, Arabinda N., 4,053,692, Cl. 429-171.000.

Pabodie, Robert M., to Monarch Marking Systems, Inc. Printing apparatus. 4,052,936, Cl. 101-93.070.

Pack, James L.: *See—*
Hass, Winfield M.; Niehaus, Howard E.; and Pack, James L., 4,053,059, Cl. 212-18.000.

Paclene Company Limited: *See—*
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Padeg A.G.: *See—*
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Pader, Morton; Miles, John J., Jr.; and Netzbandt, William, to Lever Brothers Company. Antiperspirant solution containing a mixture of substantially volatile and substantially non-volatile siloxane liquids. 4,053,581, Cl. 424-68.000.

Paganini, Bruno J.: *See—*
Advani, Jeram G.; Paganini, Bruno J.; and Hale, William J., 4,053,710, Cl. 179-1.0SB.

Pai, Damodar M.: *See—*
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Pandel-Bradford, Inc.: *See—*
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Panzer, Hans Peter; and Bardoliwalla, Dinshaw Framroze, to American Cyanamid Company. Process for preparing poly(allyltrialkylammonium) salt flocculants. 4,053,512, Cl. 260-567.60P.

Papajewski, Reinhold; and Holl, Helmer Heinz, to Singer Company, The. Zigzag control device for sewing machines. 4,052,947, Cl. 112-158.00R.

Pappo, Raphael: *See—*
Chorvat, Robert J.; and Pappo, Raphael, 4,053,476, Cl. 260-289.00D.

Paraskos, John Angelo; and Yanik, Stephen Joseph, to Gulf Research & Development Company. Hydrodesulfurization process employing a guard chamber. 4,053,391, Cl. 208-210.000.

Park, Chang-Man; and Micklewright, Donald G., to Standard Oil Company (Indiana). Production of fiber-grade terephthalic acid. 4,053,506, Cl. 260-525.000.

Parke, Davis & Company: *See—*
Doub, Leonard; Kaltenbronn, James S.; and Schweiss, Dieter, 4,053,470, Cl. 544-25.000.

Parker-Hannifin Corporation: *See—*
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Pasdera, Leonard A.: *See—*
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Patel, Raman A., to Outboard Marine Corporation. Flushing device for outboard motors. 4,052,953, Cl. 134-167.00R.

Patin, Pierre. System for continuous entrainment at variable speed. 4,053,044, Cl. 198-334.000.

Paul Anderson Industrier AB: *See—*
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Paulus, Jean Jules Henri, to C. P. Bourg. Device for shortage monitoring inside a sheet collator. 4,053,149, Cl. 270-58.000.

Paust, Joachim: *See—*
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Pav, Jarmil, to Bruderhaus Maschinen GmbH, Firma. Band filter press. 4,053,419, Cl. 210-386.000.

Peacock, Bobbie D. Pipe mold having insert support means. 4,053,134, Cl. 249-94.000.

Peacock, Jack, to U.S. Philips Corporation. Electron beam collimator. 4,053,808, Cl. 313-458.000.

Pease Company: *See—*
Beischel, Jerome K.; and Bursk, William M., 4,052,819, Cl. 49-368.000.

Pellatiro, Leonard P.: *See—*
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Pelousse, Jean A., to "s.a.PRB", Societe Anonyme. Grenades provided to be launched by a bullet. 4,052,942, Cl. 102-65.200.

Penhasi, Harry Aron; and Robbins, John Francis Whiting, to Beckman Instruments, Inc. Self cooling table top centrifuge. 4,053,104, Cl. 233-11.000.

Pennell, William E., to United States of America, Energy Research and Development Administration. Modular assembly for supporting, straining, and directing flow to a core in a nuclear reactor. 4,053,358, Cl. 176-50.000.

Pennell, William E.; and Rowan, William J., to United States of America, Energy Research and Development Administration. Nuclear reactor. 4,053,359, Cl. 176-61.000.

Pennig, Gregor, to MTU Motoren-Und Turbinen Union Munchen GmbH. Impeller for a high-speed turbomachine. 4,053,261, Cl. 416-244.00A.

Pennington, Carl E.: *See—*
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Pentz, Howard; Weed, R. Henry; and Lodholz, John C., to FMC Corporation. Sedimentation tank with raking structure. 4,053,421, Cl. 210-528.000.

Perez, Frank. Window stand for plants. 4,052,816, Cl. 47-40.000.

Perkin-Elmer Corporation, The: *See—*
Atwood, John G.; Marshall, Hamilton W., Jr.; and de Mey, Charles F., II, 4,053,236, Cl. 356-189.000.

Perkins, Carroll R.; Cable, Jesse F., III; and Link, Joseph. Battery holder. 4,053,688, Cl. 429-98.000.

Perl, Richard L., to Tappan Company, The. Control circuit and adjustable valve for a gas appliance. 4,053,136, Cl. 251-11.000.

Persik, Gerald E.: *See—*
Persik, James E.; and Persik, Gerald E., 4,052,871, Cl. 72-44.000.

Persik, James E.; and Persik, Gerald E., to J. J. & M. Stock-piercing punch mechanism. 4,052,871, Cl. 72-44.000.

Personal Communications, Inc.: *See—*
Yevick, George Johannus, 4,053,206, Cl. 350-96.00R.

Peterfalvi, Michel: *See—*
Konig, Wolfgang; Geiger, Rolf; Wissmann, Hans; Kruse, Hansjorg; and Peterfalvi, Michel, 4,053,588, Cl. 424-177.000.

Peters, Kenneth; Fewster, Sidney; Wilson, Frank; and Kearney, Kevin David Nicolas, to Chloride Group Limited. Lead acid cells and batteries. 4,053,695, Cl. 429-225.000.

Petersen, Carl Mogens, III: *See—*
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Peterson, Harold A.; and Mohan, Narendra, to Wisconsin Alumni Research Foundation. Active filter. 4,053,820, Cl. 363-44.000.

Peterson, John Allen: *See—*
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Petrosky, Joseph A., Jr.: *See*—
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Petrosky, Joseph Anthony, Jr.: *See*—
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Pfahler, Gerhard: *See*—
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Philagro: *See*—
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Phillips, David C., to Westinghouse Electric Corporation. Colloidal polyamic acid electrodeposition compositions and process for preparing said compositions. 4,053,444, Cl. 260-30.200.
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Blackwell, Jennings P., 4,053,675,Cl. 428-426.
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Drake, Charles A., 4,053,515, Cl. 260-583.00P.
Drehman, Lewis E.; Farha, Floyd, Jr.; and Moffat, Arlo J., 4,053,533, Cl. 260-681.50R.
Hogan, John P.; and Norwood, Donald D., 4,053,436, Cl. 252-452.000.
Hughes, William B., 4,053,536, Cl. 260-681.000.
Hutson, Thomas, Jr., 4,053,535, Cl. 260-683.490.
Stapp, Paul R.; and Johnson, Marvin M., 4,053,524, Cl. 260-631.00H.
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Piber, Earl T.: *See*—
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Picandet, Jean A.: *See*—
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Picenco International, Inc.: *See*—
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Pickens, Robert C., Jr.: *See*—
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Pierrat, Michel A.; and Holt, Carl J., Jr., to COMPUDRIVE Corporation. Cam-type gearing and the like. 4,052,928, Cl. 90-3.000.
Pindar, John Francis; Cohen, Jerome Martin; and Bryant, Charles Peterson, to Lubrizol Corporation, The. Hydrocarbon-substituted methylol phenols. 4,053,428, Cl. 252-52.00A.
Pinnell, William R.; and Leger, James E., to United States of America, Air Force. Velocity vector sensor for low speed airflows. 4,052,894, Cl. 73-189.000.
Pioneer Electronic Corporation: *See*—
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Pioneer Manufacturing Inc.: *See*—
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Pitney-Bowes, Inc.: *See*—
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Plant, William J.: *See*—
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Plessey Handel und Investments AG: *See*—
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Podolsky, Leaman B.; and Groves, Charles L., Jr., to Westinghouse Electric Corporation. Valve contingency detection system for a turbine power plant. 4,053,745, Cl. 364-494.000.
Poersch, Werner; Wischniewski, Martin; and Essers, Jakob, to Buttner-Schilde-Haas Aktiengesellschaft. Drying and preheating of moist coal and quenching of the formed coke. 4,053,364, Cl. 201-13.000.
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Poll, Martin, to D. Swarovski & Co. Multiple gem setting having a component of gems set in fusion adhesive foil. 4,052,863, Cl. 63-28.000.
Pollock, James Richard Allan; and Pool, Alan Aldred, to Pollock and Pool Limited. Malting at low moisture. 4,052,795, Cl. 34-12.000.
Pollock and Pool Limited: *See*—
Pollock, James Richard Allan; and Pool, Alan Aldred, 4,052,795, Cl. 34-12.000.
Pool, Alan Aldred: *See*—
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Porter, James L., to Avtron Manufacturing, Inc. Armature winding termination continuity tester and method. 4,053,830, Cl. 324-51.000.
Porter, Paul E.; and Kollmeyer, Willy D., to Shell Oil Company. Phenyl esters of (1-methyl-2-imidazolidinylidene)nitroacetic acids. 4,053,623, Cl. 424-273.00R.
Porwit, Edward I.: *See*—
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Posch, Nancy Ann, to Akzona Incorporated. Continuous flow apparatus for biological testing. 4,053,284, Cl. 23-259.000.
Potter, Glenn James. Card and bulletin displayer mounting on wall or door. 4,052,805, Cl. 40-124.000.
Potter, John Barry: *See*—
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Castellucci, Nicholas T.; and Bosso, Joseph F., 4,053,329, Cl. 148-6.15R.
Rinehart, Dale W., 4,053,679, Cl. 428-410.000.
Pradhan, Ashok V.; and George, John A., to Westinghouse Electric Corporation. Air box shock absorber for a nuclear reactor. 4,053,357, Cl. 176-37.000.
Prillinger, Peter F. M.; Rosenberger, Paul C.; and Sieving, Alfred W., to Caterpillar Tractor Co. Brake master cylinder construction. 4,052,855, Cl. 60-547.000.
Probst, John F., to P.A.L. Development Corporation. Apparatus for dislodging and collecting materials. 4,053,183, Cl. 299-36.000.
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Pypker, Jacob: *See*—
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Quercia, Charles. Burglar alarm system. 4,053,869, Cl. 340-64.000.
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Rahaim, Thomas J.; Schaller, Richard J.; and Wiley, Elbert H., Jr., to Westinghouse Electric Corporation. Stator vane assembly for gas turbines. 4,053,257, Cl. 415-214.000.

Ramsby, Sten Ingvar: *See—*
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Ratony, Alexander. Staggered channel wing-type aircraft. 4,053,125, Cl. 244-46.000.

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Raymond Lee Organization, Inc., The: *See—*
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Raytheon Company: *See—*
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Olsen, Gregory Hammond; and Ban, Vladimir Sinisa, 4,053,350, Cl. 156-659.000.
Rosen, Arye; and Napoli, Louis Sebastian, 4,053,841, Cl. 329-103.000.
Turski, Zygmond; and Mawhinney, Daniel David, 4,053,842, Cl. 329-103.000.

Recca, Frank A.; and Winter, David J. Telephone system and method for providing directory assistance/intercept information. 4,053,949, Cl. 364-200.000.

Recherche et Industrie Therapeutiques: *See—*
Dobrescu, Lucia; and Huygelen, Constant, 4,053,584, Cl. 424-92.000.

Reckitt & Colman Products Limited: *See—*
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Recognition Equipment Incorporated: *See—*
Lafevers, James O.; and Kao, Charles T., 4,053,737, Cl. 235-61.11D.

Redmond, John D., Jr., to Gates Rubber Company, The. Method for producing a positive drive belt. 4,053,547, Cl. 264-102.000.

Redmond, Thomas F.: *See—*
Dougherty, William E., Jr.; Gregor, Lawrence V.; Klein, Donald L.; Redmond, Thomas F.; and Reeber, Morton D., 4,053,942, Cl. 361-385.000.

Reeber, Morton D.: *See—*
Dougherty, William E., Jr.; Gregor, Lawrence V.; Klein, Donald L.; Redmond, Thomas F.; and Reeber, Morton D., 4,053,942, Cl. 361-385.000.

Reed, Richard S.; and Glueck, Alan R., to Catalox Corporation. Removal of contaminants from gaseous streams. 4,053,554, Cl. 423-210.500.

Reed Tool Company: *See—*
Rodriguez, Ralph V., 4,053,306, Cl. 75-123.00J.

Regan, Robert J.; Haugsjaa, Paul O.; and McNeill, William H., to GTE Laboratories Incorporated. Continuous automatic starting assist UV circuit for microwave powered electrodeless lamps. 4,053,814, Cl. 315-248.000.

Reick, Franklin G., to Ebert, Michael, a part interest. Sealing compound. 4,053,443, Cl. 260-29.60F.

Reid, Joyce: *See—*
Hauck, Frederic Peter; Reid, Joyce; Narayanan, Venkatachala L.; Cimarusti, Christopher M.; Haugwitz, Rudiger D.; and Sundeen, Joseph E., 4,053,596, Cl. 424-244.000.

Reindl, Adolf, to United States of America, Army. Adaptive digital coder and decoder. 4,053,712, Cl. 179-15.55T.

Reinhard, Russell R.: *See—*
Kerr, Edwin R.; Dorawala, Tansukhlal G.; and Reinhard, Russell R., 4,053,531, Cl. 260-672.00R.

Reinhardt, Hans; Ottertun, Harald Daniel; and Rydberg, Jan Helge Arnold, to Nife Jungner AB. Method for selective recovery of cadmium from cadmium-bearing waste. 4,053,553, Cl. 423-105.000.

Reinhardt, Paul W. Fishing lure. 4,052,809, Cl. 43-42.220.

Reininger, Wolfgang; and Hartl, Alfons, to Atlantic Research Institute Limited. Method of acylation of phloroglucinol. 4,053,517, Cl. 260-586.00D.

Reinkenobbe, Heinz-Otto: *See—*
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Reiss, Rolf Richard Wilhelm: *See—*
Schmid, Manfred Carl; and Reiss, Rolf Richard Wilhelm, 4,053,648, Cl. 426-117.000.

Reiter, Lothar. Method and arrangement of masses avoiding chattering. 4,053,729, Cl. 200-288.000.

Reiter, Robert C., to Material Control, Inc. Resiliently mounted conveyor belt cleaner. 4,053,045, Cl. 198-499.000.

Rektorat Slovenskej vysokej skoly technickej: *See—*
Tkac, Alexander; and Cvengros, Jan, 4,053,006, Cl. 159-6.00W.

Remaley, James H.: *See—*
Healey, William E.; Heineman, Morse R.; Erlich, Ricky M.; and Remaley, James H., 4,053,001, Cl. 141-2.000.

Renz, Gerhard: *See—*
Ernst, Wolfram; Rohrig, Josef; and Renz, Gerhard, 4,053,793, Cl. 307-207.000.

Research Corporation: *See—*
Collier, John R.; and Tam, Thomas Y. T., 4,053,270, Cl. 425-144.000.
Davidson, James P.; Rosenberg, Barnett; and Hinz, Ronald W., 4,053,587, Cl. 424-131.000.

Research Triangle Institute: *See—*
Swaisgood, Harold E., 4,053,644, Cl. 426-42.000.

Rexnord Inc.: *See—*
Yeasting, Maynard Charles, 4,053,817, Cl. 318-128.000.

Ribba, Alain: *See—*
Bonnet, Jean Claude; and Ribba, Alain, 4,053,440, Cl. 260-4.00R.

Rice, Robert L.; and Mast, Aquila D., to Sperry Rand Corporation. Mechanism for opening and closing a crop material roll forming region in a roll forming machine. 4,052,841, Cl. 56-341.000.

Rich, Elvis: *See—*
Day, Roger W.; Ormsby, George S.; and Rich, Elvis, 4,053,393, Cl. 209-211.000.

Richard A. Shaw, Inc.: *See—*
Shaw, Richard A., 4,052,836, Cl. 53-25.000.

Richardson, Philip C.: *See—*
Hudspeth, Emmett L.; Richardson, Philip C.; Neathery, John L., Jr.; Dykstra, Jerald P.; Boger, Allen D., Jr.; Sims, William B., Jr.; Hunt, Glenn E.; and Quisenberry, Tony M., 4,053,951, Cl. 364-415.000.

Richter, Robert Dean: *See—*
Stammreich, John Creighton; and Richter, Robert Dean, 4,053,177, Cl. 292-113.000.

Richter, Sidney B., to Velsicol Chemical Corporation. Selective herbicidal compositions. 4,053,297, Cl. 71-88.000.

Ricoh Co., Ltd.: *See—*
Furukawa, Masamichi; and Iguchi, Susumu, 4,053,831, Cl. 324-77.00A.
Hayashi, Toshio; Goto, Kazuo; and Haruyama, Osamu, 4,052,959, Cl. 118-644.000.
Ogawa, Mutsuo, 4,053,930, Cl. 358-133.000.

Riebel, Hans-Jochem; Homeyer, Bernhard; and Hammann, Ingeborg, to Bayer Aktiengesellschaft. O-alkyl-O-[4,6-dimethyl-5-chloropyrimidin-(2)-yl]-(thiono) (thiol) phosphoric acid esters. 4,053,594, Cl. 424-200.000.

Riedle, Rudolf: *See—*
Deinhammer, Wolfgang; Frey, Volker; Wick, Manfred; and Riedle, Rudolf, 4,053,495, Cl. 260-448.20E.

Riewald, Paul Gordon; Krueger, William Henry; and Dhingra, Ashok Kumar, to Du Pont de Nemours, E. I., and Company. Process for reinforcing aluminum alloy. 4,053,011, Cl. 164-97.000.

Rilling, Charles A. Cartop trunk boat. 4,052,761, Cl. 9-2.00S.

Rimlinger, Donald C.: *See—*
Niertit, Frank; and Rimlinger, Donald C., 4,052,970, Cl. 123-139.0AW.

Rinehart, Dale W., to PPG Industries, Inc. Chemically strengthened opal glass. 4,053,679, Cl. 428-410.000.

Ring Tool and Die Company: *See—*
Turnas, Angelo, 4,052,883, Cl. 73-12.000.

Riordan, Keith: *See—*
Hose, R. Kenneth, Jr.; Riordan, Keith; and Martin, Stephen M., 4,053,821, Cl. 363-60.000.

Rippel, Leopold: *See—*
Karobath, Ernst; Rippel, Leopold; Pulitzer, Wolfgang; and Schmidinger, Hans, 4,053,273, Cl. 425-357.000.

Roark, Eugene, to Jno H. Swisher & Son, Inc. Plastic film wrapper. 4,053,046, Cl. 206-274.000.

Robbins, John Francis Whiting: *See—*
Penhasi, Harry Aron; and Robbins, John Francis Whiting, 4,053,104, Cl. 233-11.000.

Roberts, Elliott J.; Bunk, Stanley; and Angevine, Peter Allen, to Dorr-Oliver Incorporated. Process for recovery of alumina-cryolite waste in aluminum production. 4,053,375, Cl. 204-67.000.

Roberts, Frank William; Roberts, Richard Allen; Roberts, Waldo Calvin; and Blanpied, Robert Howard. Panel building construction and method, and clip. 4,052,831, Cl. 52-309.800.

Roberts, Richard Allen: *See—*
Roberts, Frank William; Roberts, Richard Allen; Roberts, Waldo Calvin; and Blanpied, Robert Howard, 4,052,831, Cl. 52-309.800.

Roberts, Waldo Calvin: *See—*
Roberts, Frank William; Roberts, Richard Allen; Roberts, Waldo Calvin; and Blanpied, Robert Howard, 4,052,831, Cl. 52-309.800.

Robie, Edward Thomas, to International Business Machines Corporation. Electrical energizable apparatus and adapter connector for use therewith. 4,053,788, Cl. 307-11.000.

Robin, Leon; and Hawkes, Thaddeus, to Thomson-CSF. Arrangement for measuring the lag between two timed signals by electronic correlation. 4,053,888, Cl. 343-13.00R.

Robinson, Hugh S., to D. R. Sperry & Co. Three way cock for filter press plates. 4,052,998, Cl. 137-625.500.

Robinson, Leon; and Sass, Allan, to Occidental Research Corporation. Process for reducing the sulfide sulfur content of char with carbon dioxide and H_2O. 4,053,285, Cl. 44-1.00F.

Robot Research, Inc.: *See—*
Hawkins, Joseph Key; and Cavanaugh, Leo Francis, 4,053,931, Cl. 358-134.000.
Rockwell International Corporation: *See—*
DeForest, William S.; and Connelly, Henry V., Jr., 4,053,351, Cl. 156-661.000.
Shaheen, Joseph M.; and Simone, John, 4,052,787, Cl. 29-626.000.
Rodgers, Leonard John; and Stuart, Alan, to Rolls-Royce Limited. Gas turbine engine gas flow ducts. 4,052,847, Cl. 60-262.000.
Rodriguez, George H.; and Maher, John P., to Sprague Electric Company. Thermistor with leads and method of making. 4,053,864, Cl. 338-22.0SD.
Rodriguez, Ralph V., to Reed Tool Company. Tungsten carbide-steel alloy. 4,053,306, Cl. 75-123.00J.
Roe, Anthony Maitland: *See—*
Coates, William John; Roe, Anthony Maitland; Slater, Robert Antony; and Taylor, Edwin Michael, 4,053,601, Cl. 424-250.000.
Rogers, Edward F.: *See—*
Graham, Donald W.; Rogers, Edward F.; and Ashton, Wallace T., 4,053,602, Cl. 424-251.000.
Rogers, John Sleeman: *See—*
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Rohm and Haas Company: *See—*
Hurt, William S., 4,053,499, Cl. 260-456.00P.
Miller, George A.; and Lewis, Sheldon N., 4,053,479, Cl. 260-302.00A.
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Roman, Leonard F.; and Elliott, George H., to California Linear Circuits, Inc. Ion-implanted semiconductor abrupt junction. 4,053,924, Cl. 357-63.000.
Rose, Leslie C.: *See—*
Hamrick, Joseph T.; and Rose, Leslie C., 4,053,015, Cl. 166-302.000.
Rosen, Arye; and Napoli, Louis Sebastian, to RCA Corporation. Microwave frequency discriminator comprising an FET amplifier. 4,053,841, Cl. 329-103.000.
Rosen, Perry, to Hoffmann-La Roche Inc. 15-Oxaandrostanes and 15-oxopregnanes. 4,053,487, Cl. 260-346.710.
Rosenberg, Barnett: *See—*
Davidson, James P.; Rosenberg, Barnett; and Hinz, Ronald W., 4,053,587, Cl. 424-131.000.
Rosenberger, Paul C.: *See—*
Prillinger, Peter F. M.; Rosenberger, Paul C.; and Sieving, Alfred W., 4,052,855, Cl. 60-547.000.
Rosenkranz, Hans Jurgen; Rudolph, Hans; and Apel, Gerhard, to Bayer Aktiengesellschaft. Stabilized acrylic acid esters of polyhydric alcohols and a process for their preparation. 4,053,504, Cl. 560-4.000.
Rosenstock, Friedrich; Hastik, Walter; and Becker, Reinhold, to Metallgesellschaft Aktiengesellschaft. Dry grinding process for reducing ore to pelletizable particles. 4,053,113, Cl. 241-30.000.
Rosenthal, Lawrence David. Video game system. 4,053,740, Cl. 364-705.000.
Ross, Douglas; and Blackburn, Keith. Container transport system and apparatus. 4,053,072, Cl. 214-512.000.
Ross, J. Bowen, Jr.: *See—*
Cartwright, William F.; Means, Richard E.; Kallianos, Andrew G.; and Ross, J. Bowen, Jr., 4,052,993, Cl. 131-9.000.
Ross, Svante Bertil: *See—*
Carnmalm, Bernt Sigfrid Emanuel; De Paulis, Tomas; Ross, Svante Bertil; Ramsby, Sten Ingvar; Stjernstrom, Nils-Erik; and Ogren, Sven-Ove, 4,053,632, Cl. 424-316.000.
Carnmalm, Bernt Sigfrid Emanuel; Lindberg, Ulf Henrik Anders; de Paulis, Tomas; Ross, Svante Bertil; Stjernstrom, Nils-Erik; Ulff, Carl Bengt Johan; and Ogren, Sven-Ove, 4,053,637, Cl. 424-330.000.
Rotter, Friedrich, to Schloemann-Siemag Aktiengesellschaft. Bedplates for a rolling mill or the like. 4,052,876, Cl. 72-237.000.
Roueche, Armand, to Ciba-Geigy Corporation. Disazo pigments containing ether substituted alkoxy carbonyl groups. 4,053,464, Cl. 260-174.000.
Rounds, Charles E. System for fuel supplementation. 4,053,683, Cl. 429-8.000.
Roussel-UCLAF: *See—*
Martel, Jacques; Heymes, Rene; and Lutz, Andre, 4,053,597, Cl. 424-246.000.
Poittevin, Andre; and Torelli, Vesperto, 4,053,618, Cl. 424-270.000.
Rovnyak, George C.; Narayanan, Venkatachala Lakshmi; and Haugwitz, Rudiger D., to E. R. Squibb & Sons, Inc. 1,3,4,5,15,Thiazolinyl and 1,3 thiazinyl substituted indolinones. 4,053,613, Cl. 424-246.000.
Rowan, William J.: *See—*
Pennell, William E.; and Rowan, William J., 4,053,359, Cl. 176-61.000.
Rowley, Leroy S.; and Halberstadt, Harry J., to Lockheed Missiles & Space Company Inc. End-reacting electrochemical battery. 4,053,685, Cl. 429-68.000.
Roy, Kenneth Lee, to Globe-Union Inc. Push button switch mode indicator element. 4,052,954, Cl. 116-124.00L.
Royal, Thomas B., to International Paper Company. Tray forming method. 4,052,933, Cl. 93-51.00M.
Roylance, Thomas William: *See—*
Fox, John Francis; Roylance, Thomas William; and Mair, Angus Campbell, 4,053,379, Cl. 204-160.100.
Rozeboom, Tunis Junior. Retrieving vehicle. 4,053,070, Cl. 214-505.000.
RTE Corporation: *See—*
Estes, Michael J., 4,053,938, Cl. 361-37.000.
Ruckle, Duane Louis: *See—*
Henricks, Robert Jacobi; Ruckle, Duane Louis; and Slack, Raymond Bender, 4,053,330, Cl. 148-11.50F.
Rudolph, Hans: *See—*
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Rudolph, Louis R.: *See—*
Woodson, David S., III; and Rudolph, Louis R., 4,053,890, Cl. 343-17.700.
Rufer, Clemens; Schroder, Eberhard; and Kessler, Hans-Joachim, to Schering Aktiengesellschaft. 2-(5-Nitro-2-imidazolyl)-benzimidazoles. 4,053,472, Cl. 544-139.000.
Ruprecht, Hans Dieter; and Henrichs, Paul, to Bayer Aktiengesellschaft. Process for the production of elastic composites. 4,053,537, Cl. 260-859.00R.
Ryan, Carl R.; and Stilwell, James H., to Motorola Inc. Quadriphase shift keyed adaptive equalizer. 4,053,837, Cl. 325-323.000.
Rydberg, Jan Helge Arnold: *See—*
Reinhardt, Hans; Ottertun, Harald Daniel; and Rydberg, Jan Helge Arnold, 4,053,553, Cl. 423-105.000.
Rydz, John Stephen; and Wurst, John Whilldin, to Singer Company, The. Electronic control package for sewing machine. 4,052,946, Cl. 112-158.00E.
Rykwalder, Stanley J.: *See—*
Brendel, Albert E.; and Rykwalder, Stanley J., 4,052,905, Cl. 73-483.000.
"s.a.PRB", Societe Anonyme: *See—*
Pelousse, Jean A., 4,052,942, Cl. 102-65.200.
S. C. Johnson & Son, Inc.: *See—*
Dill, Douglas W., 4,053,664, Cl. 427-379.000.
Sable, Claude: *See—*
Chardonneau, Joel; and Sable, Claude, 4,052,907, Cl. 74-89.220.
Sado, Ichiro; Kishimoto, Juji; Saito, Seiji; and Sakurai, Atsushi, to Canon Kabushiki Kaisha. Electronic calculator with function keys. 4,053,753, Cl. 2364-709.000.
Safe Flight Instrument Corporation: *See—*
Greene, Leonard M., 4,053,883, Cl. 343-7.300.
Safranek, William H.: *See—*
Yamashita, Keizo; Wada, Tatsuo; Okamura, Yukio; and Safranek, William H., 4,053,370, Cl. 204-13.000.
SAFT-Societe des Accumulateurs Fixes et de Traction: *See—*
Coibion, Jean; and Lafaye, Jean, 4,053,687, Cl. 429-94.000.
Saintonge, Jerome. Multiple pouch bagging apparatus. 4,052,837, Cl. 53-62.000.
Saito, Mitsuo: *See—*
Shichida, Hiromichi; Katsube, Hideo; Toyoda, Kenichi; and Saito, Mitsuo, 4,053,251, Cl. 408-35.000.
Saito, Nakaji. Seabed mining utilizing circulating current based on water level differences. 4,053,181, Cl. 299-9.000.
Saito, Seiji: *See—*
Sado, Ichiro; Kishimoto, Juji; Saito, Seiji; and Sakurai, Atsushi, 4,053,753, Cl. 2364-709.000.
Saito, Takeo; Takazawa, Yuzuru; Nagaoka, Shinji; and Seki, Yoichi, to Seiko Koki Kabushiki Kaisha. Exposure multiple setting device for programming electric shutter. 4,053,908, Cl. 354-31.000.
Sakamoto, Kaneaki, to Kabushiki Kaisha Ogura Chuck Seisakusho. Small size, portable bender. 4,052,875, Cl. 72-217.000.
Sakurai, Atsushi: *See—*
Sado, Ichiro; Kishimoto, Juji; Saito, Seiji; and Sakurai, Atsushi, 4,053,753, Cl. 2364-709.000.
Salata, Joseph M. Golf club swing training device. 4,053,160, Cl. 273-186.00A.
Saletan, David I.; Yeung, Reginald S.; and Pledger, William R., to Shell Oil Company. Process for production of glycerine. 4,053,525, Cl. 260-635.00E.
Saliaris, George P., to Sigma Scientific Development, Inc. Hose clamp. 4,053,135, Cl. 251-10.000.
Salisbury, Thomas E., to American Hospital Supply Corporation. Instrument tray and soak basin combination. 4,053,280, Cl. 21-87.000.
Salzgeber, Daniel E.; Raufeisen, Robert; and Davis, Charles W., to Stanadyne, Inc. Fuel injection pump and timing control therefor. 4,052,971, Cl. 123-139.0AQ.
Salzgitter AG: *See—*
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Samcoe Holding Corporation: *See—*
Frezza, Robert, 4,053,151, Cl. 270-79.000.
Sandoz, Inc.: *See—*
Hardtmann, Goetz E.; and Kathawala, Faizulla G., 4,053,600, Cl. 424-250.000.
Sandoz Ltd.: *See—*
Eichenberger, Erwin; and Neumann, Peter, 4,053,617, Cl. 424-270.000.
Sandvik Aktiebolag: *See—*
Schmitz, Hermann; and Wellisch, Ferdinand, 4,052,918, Cl. 82-36.00R.
Sanford, B. Paul, to Cougar Instruments Corporation. Rotation-to-reciprocating motion converting tool. 4,052,781, Cl. 29-560.000.

Sanka, Tsugio: *See—*
Yoshioka, Yuichi; and Sanka, Tsugio, 4,053,449, Cl. 261-44.00R.

Sankyo Company Limited: *See—*
Morisawa, Yasuhiro; Kataoka, Mitsuru; Kitano, Noritoshi; and Matsuzawa, Toshiaki, 4,053,608, Cl. 424-266.000.

Sass, Allan: *See—*
Robinson, Leon; and Sass, Allan, 4,053,285, Cl. 44-1.00F.

Sato, Akihiko, to Nippon Kogaku K.K. Electric shutter device for a focal plane shutter. 4,053,913, Cl. 354-244.000.

Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, to Fuji Photo Film Co., Ltd. Silver halide photographic emulsions. 4,053,318, Cl. 96-139.000.

Sato, Yasushi: *See—*
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, 4,053,898, Cl. 346-1.000.

Satomura, Masato, to Fuji Photo Film Co., Ltd. Unsaturated polyester ether having a photocrosslinkable moiety. 4,053,415, Cl. 204-159.190.

Saunders, John Christopher: *See—*
Boyle, John Terence Arnott; and Saunders, John Christopher, 4,053,615, Cl. 424-267.000.

Saunders, Linda Anne, to Du Pont de Nemours, E. I., and Company. High-recovery force warp knit stretch fabric with lengthwise stabilization. 4,052,866, Cl. 66-193.000.

Saylor, Lee H., to Sealed Power Corporation. Spacer-expander for a piston oil control ring. 4,053,164, Cl. 277-139.000.

Scaife, Colin, to Reckitt & Colman Products Limited. Device for introducing medicaments or the like into body cavities. 4,052,986, Cl. 128-260.000.

Schaad, William J., to Indak Manufacturing Corporation. Push-button electrical switch. 4,053,726, Cl. 200-159.00R.

Schaaf, Robert: *See—*
Howard, Laurence M.; and Schaaf, Robert, 4,053,416, Cl. 210-227.000.

Schacht, Erich; Mehrhof, Werner; Nowak, Herbert; Simane, Zdenek; and Kayser, Detlev, to Merck Patent Gesellschaft mit beschrankter Haftung. Cholesterol level-lowering phenoxyacetic acids. 4,053,626, Cl. 424-275.000.

Schadow, Klaus, to United States of America, Navy. Baffled combustion chamber. 4,052,846, Cl. 60-251.000.

Schalkowsky, Samuel; and Clipp, Louis L., to Exotech, Incorporated. Shock press. 4,053,110, Cl. 241-1.000.

Schaller, Richard J.: *See—*
Rahaim, Thomas J.; Schaller, Richard J.; and Wiley, Elbert H., Jr., 4,053,257, Cl. 415-214.000.

Schaub, Wolfgang: *See—*
Effland, Richard C.; Davis, Larry; and Schaub, Wolfgang, 4,053,599, Cl. 424-250.000.

Scheiner, Bernard J.: *See—*
Smyres, Gary A.; Haskett, Philip R.; Scheiner, Bernard J.; and Lindstrom, Roald E., 4,053,305, Cl. 75-104.000.

Scher, Herbert B., to Stauffer Chemical Company. Controlled release system for juvenile hormones in aqueous environment. 4,053,627, Cl. 424-278.000.

Schering Aktiengesellschaft: *See—*
Burba, Christian; and Borner, Peter, 4,053,503, Cl. 560-202.000.
Rufer, Clemens; Schroder, Eberhard; and Kessler, Hans-Joachim, 4,053,472, Cl. 544-139.000.

Schering Corporation: *See—*
Daniels, Peter J. L.; and McCombie, Stuart W., 4,053,591, Cl. 424-180.000.
Faro, Hans-Peter; and Symchowicz, Samson, 4,053,509, Cl. 260-557.00R.

Scherr, Mary Ann; and Hosterman, Harry L., to Scherr, Mary Ann. Jewelry and bracelet heartbeat monitor. 4,052,979, Cl. 128-2.05P.

Scherrer, Hanspeter; and Bolier, Arthur, to Hoffmann-La Roche Inc. Liquid crystalline biphenyls. 4,053,431, Cl. 252-299.000.

Scheuermann, Horst: *See—*
Jersak, Ulrich; and Scheuermann, Horst, 4,053,527, Cl. 260-646.000.

Schick, John W.: *See—*
Davis, Robert H.; and Schick, John W., 4,053,426, Cl. 252-34.000.

Schiller, Michael. Finger identification. 4,053,228, Cl. 356-71.000.

Schindel, Wesley Gerald, to Du Pont de Nemours, E. I., and Company. Catalyzed fluorination of chlorocarbons. 4,053,530, Cl. 260-653.800.

Schindler, Rudolf A.: *See—*
United States of America, National Aeronautics and Space Administration; and Schindler, Rudolf A., 4,053,231, Cl. 356-106.00S.

Schlafer, John, to GTE Laboratories Incorporated. Optical scanning apparatus for photolithography of a color cathode ray tube having an aperture mask. 4,053,905, Cl. 354-1.000.

Schlain, David; McCawley, Frank X.; and Smith, Gerald R., to United States of America, Interior. Electrodeposition of copper. 4,053,377, Cl. 204-106.000.

Schlax, Timothy R.: *See—*
Colling, Ronald L.; Trenne, Myron U.; and Schlax, Timothy R., 4,052,967, Cl. 123-117.00D.

Schldemann-Siemag Aktiengesellschaft: *See—*
Zilges, Franz Josef; and Siegert, Klaus, 4,052,877, Cl. 72-253.00A.

Schloemann-Siemag Aktiengesellschaft: *See—*
Rotter, Friedrich, 4,052,876, Cl. 72-237.000.

Schmid, Manfred Carl; and Reiss, Rolf Richard Wilhelm. Bottle for sterile dispensing of flowable contents. 4,053,648, Cl. 426-117.000.

Schmidinger, Hans: *See—*
Karobath, Ernst; Rippel, Leopold; Pulitzer, Wolfgang; and Schmidinger, Hans, 4,053,273, Cl. 425-357.000.

Schmidt, Bradley J., to Illinois Tool Works Inc. Terminal cap. 4,053,705, Cl. 174-138.00F.

Schmidt, Felix: *See—*
Hubner, Manfred; Heerdt, Ruth; Schmidt, Felix; and Thiel, Max, 4,053,624, Cl. 424-274.000.

Schmidt, Ferenc J., to Ametek, Inc. Electrolytic filter for electrolytically filtering and recovering metals from colloidal suspensions. 4,053,386, Cl. 204-264.000.

Schmidt, Manfred: *See—*
Fleischmann, Werner; Reinkenobbe, Heinz-Otto; and Schmidt, Manfred, 4,053,278, Cl. 432-137.000.

Schmidt, Otto: *See—*
Diepers, Heinrich; Schmidt, Otto; and Musebeck, Horst, 4,052,784, Cl. 29-599.000.

Schmidtmann, Burchard, to Licentia Patent-Verwaltungs-G.m.b.H. Chrominance amplifier control circuit providing simultaneous adjustment of gain and DC level. 4,053,927, Cl. 358-29.000.

Schmitz, Herbert, to Uniroyal Ltd. Fabric protecting means. 4,053,115, Cl. 242-77.100.

Schmitz, Hermann; and Wellisch, Ferdinand, to Sandvik Aktiebolag. Tool head mounting arrangement for a lathe. 4,052,918, Cl. 82-36.00R.

Schneeberger, Ernst, to Molins Limited. Apparatus for severing and overlapping material web sections, especially for a packaging machine for tobacco products. 4,052,840, Cl. 53-389.000.

Schneider, Fritz W.; Clausen, Helmut; and Kelterbaum, Manfred, to Elastogran Maschinenbau GmbH & Co. Mixing device for mixing together multi-component plastics materials. 4,053,283, Cl. 23-252.00R.

Schneider, Jurg; and Fattinger, Volker, to Ciba-Geigy Corporation. Gas scrubbing plant. 4,053,292, Cl. 55-227.000.

Scholz, John A.; Gardner, Phillip J.; and Silver, H. Graham, to GTE Sylvania Incorporated. Arc discharge lamp comprising mercury, scandium and lithium iodide, scandium emission being suppressed. 4,053,805, Cl. 313-229.000.

Schrag, Thomas Gene; Burkhart, Merle Keith; and Goertz, Arnold Elmer, to Hesston Corporation. Method and apparatus for transporting and processing multiple round bales. 4,053,071, Cl. 214-506.000.

Schreiber, William L.; Siano, James N.; Vock, Manfred Hugo; and Shuster, Edward J., to International Flavors & Fragrances Inc. Foods and flavor use of 1-(3,3-dimethyl-2-norbornyl-2-propanone. 4,053,657, Cl. 426-538.000.

Schrider, Michael Stanley, to American Cyanamid Company. Systemic control of ectoparasites with α-cyano-m-phenoxybenzyl α-C_1-C_4 alkyl-2-naphthaleneacetates. 4,053,631, Cl. 424-304.000.

Schroder, Eberhard: *See—*
Rufer, Clemens; Schroder, Eberhard; and Kessler, Hans-Joachim, 4,053,472, Cl. 544-139.000.

Schrodter, Klaus: *See—*
Harnisch, Heinz; Ehlers, Klaus-Peter; and Schrodter, Klaus, 4,053,562, Cl. 423-313.000.

Schuler, Dale L.: *See—*
Wright, John W.; Plant, William J.; and Schuler, Dale L., 4,053,886, Cl. 343-5.0SA.

Schultenkamper, Josef; Eckert, Bernd; and Schumann, Siegfried, to Gelenkwellenbau GmbH. Coupling flange for a torque transmitting shaft. 4,053,248, Cl. 403-337.000.

Schultz, Frederick E.; and Garber, Albert M., to General Electric Company. Polar weave flywheel assembly. 4,052,913, Cl. 74-572.000.

Schultz, Lawrence A.: *See—*
Deslauriers, Paul C.; Voelker, Richard P.; Lecourt, Everett J.; and Schultz, Lawrence A., 4,053,406, Cl. 210-71.000.

Schultz, Sheldon L., to Honeywell Inc. Touch actuated system responsive to a combination of resistance and capacitance. 4,053,789, Cl. 307-116.000.

Schultz, Thomas W., to GTE Sylvania Incorporated. Scanning rate and intensity control for optical scanning apparatus. 4,053,903, Cl. 354-1.000.

Schultz, Thomas W., to GTE Sylvania Incorporated. Control system for an optical scanning exposure system for manufacturing cathode ray tubes. 4,053,906, Cl. 354-1.000.

Schulze, Stephen R., to Allied Chemical Corporation. Solutions of ethylene-chlorotrifluoroethylene copolymers. 4,053,445, Cl. 260-31.20R.

Schumann, Siegfried: *See—*
Schultenkamper, Josef; Eckert, Bernd; and Schumann, Siegfried, 4,053,248, Cl. 403-337.000.

Schwartz, Joseph: *See—*
Krapcho, John; and Schwartz, Joseph, 4,053,514, Cl. 260-570.00R.

Schwarz, Frederick Michael: *See—*
Chaplin, Gary Francis; and Schwarz, Frederick Michael, 4,053,254, Cl. 415-116.000.

Schwarz, Wolfgang: *See—*
Herrle, Karl; Gausepohl, Hermann; and Schwarz, Wolfgang, 4,053,696, Cl. 526-65.000.

Schwarze, Werner; and Wolff, Siegfried, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Reaction product of 4,4-bis-(hydroxymethyl)-cyclohexene compounds with sulfur. 4,053,461, Cl. 260-125.000.

Schweinsberg, Dieter Klaus-Jurgen, to Eichner Organisation KG. Data carrier holder with identification strip. 4,052,807, Cl. 40-359.000.

Schweiss, Dieter: *See—*
Doub, Leonard; Kaltenbronn, James S.; and Schweiss, Dieter, 4,053,470, Cl. 544-25.000.

Schwerdtel, Wulf: *See—*
Seifert, Hermann; Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,053,523, Cl. 260-621.00G.
Scully, Marlan O., to University Patents, Inc. X-Ray laser utilizing gas jet. 4,053,783, Cl. 250-493.000.
Sealed Power Corporation: *See—*
Saylor, Lee H., 4,053,164, Cl. 277-139.000.
Sears, Roebuck and Co.: *See—*
Martelet, Ronald G., 4,053,091, Cl. 224-32.00A.
Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain & Northern Ireland, The: *See—*
Tolmon, Francis Richard, 4,053,239, Cl. 356-250.000.
Seibert, Michael, to GTE Laboratories Incorporated. Process for storing and recovering plant tissue. 4,052,817, Cl. 47-58.000.
Seifert, Hermann; Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, to Bayer Aktiengesellschaft. Process for the hydroxylation of phenol. 4,053,523, Cl. 260-621.00G.
Seiko Koki Kabushiki Kaisha: *See—*
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Seki, Yoichi: *See—*
Saito, Takeo; Takazawa, Yuzuru; Nagaoka, Shinji; and Seki, Yoichi, 4,053,908, Cl. 354-31.000.
Selivanov, Anatoly Grigorievich; and Kovalev, Gennady Ivanovich. Shedding mechanism for travelling-wave looms. 4,053,000, Cl. 139-436.000.
Semperit Anstalt: *See—*
Longhetto, Francesco, 4,052,899, Cl. 73-300.000.
Sendo, Yuji: *See—*
Yoshioka, Mitsuru; Murakami, Masayuki; and Sendo, Yuji, 4,053,469, Cl. 544-21.000.
Sensor Technology, Inc.: *See—*
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Sethi, Gurdip Singh; and Cole, Thomas Walter, to Eastman Kodak Company. Apparatus for removing webs from cartridges. 4,052,921, Cl. 83-409.000.
Seto, Masahiko: *See—*
Kawazu, Mitsutaka; Wagatsuma, Mitsuyoshi; Seto, Masahiko; Miyagishima, Toshikazu; Yamaguchi, Totaro; and Ohshima, Satoshi, 4,053,609, Cl. 424-271.000.
Seuter, Friedel: *See—*
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Sewell, Harry: *See—*
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Seymour, Eugene Wesley: *See—*
Smith, Irvin Darrow; and Seymour, Eugene Wesley, 4,053,592, Cl. 424-181.000.
Sforza, Anthony. Bacterial isolation method and device. 4,053,362, Cl. 195-103.50R.
Shaheen, Joseph M.; and Simone, John, to Rockwell International Corporation. Method of fabricating a beam lead flexible circuit. 4,052,787, Cl. 29-626.000.
Shankar, Ramesh: *See—*
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Shapiro, Howard E.: *See—*
Merz, Kenneth M.; and Shapiro, Howard E., 4,053,866, Cl. 338-309.000.
Shaw, Frank D., to Swan Recreational Products Limited. Underwater swimming pool illumination systems. 4,053,758, Cl. 362-158.000.
Shaw, Richard A., to Richard A. Shaw, Inc. Package filling machine and method. 4,052,836, Cl. 53-25.000.
Shea, Lawrence E. Synthetic resin composition-method and product. 4,053,447, Cl. 260-38.000.
Shell Oil Company: *See—*
Kollmeyer, Willy D., 4,053,619, Cl. 424-273.00R.
Kollmeyer, Willy D., 4,053,622, Cl. 424-273.00R.
McClure, James D.; and Neumann, Friedrich E., 4,053,522, Cl. 260-619.00A.
Porter, Paul E.; and Kollmeyer, Willy D., 4,053,623, Cl. 424-273.00R.
Saletan, David I.; Yeung, Reginald S.; and Pledger, William R., 4,053,525, Cl. 260-635.00E.
Shelly, Robert S.: *See—*
George, Lyndell J. C.; and Shelly, Robert S., 4,053,238, Cl. 356-249.000.
Shen, Tsung-Ying; Jones, Howard; and Dorn, Conrad P., to Merck & Co., Inc. Mercaptoalkylpyridine disulfides. 4,053,606, Cl. 424-263.000.
Sheridan, Lee A.; Kovener, Gary S.; Ostrofsky, Bernard; and Nebelsiek, Hilbert J., to Standard Oil Company. Ultrasonic testing device and method. 4,052,887, Cl. 73-67.80S.
Sherrill, John C. Pedometer distance-measuring device. 4,053,755, Cl. 364-561.000.
Shiba, Haruo, to TDK Electronics Co., Ltd. Tape cassette with flexible aperture closure. 4,053,935, Cl. 360-60.000.
Shichida, Hiromichi; Katsube, Hideo; Toyoda, Kenichi; and Saito, Mitsuo. Drilling machine with automatic tool changer. 4,053,251, Cl. 408-35.000.
Shiga, Akinobu: *See—*
Asada, Mamoru; Shiga, Akinobu; and Matsuyama, Kiyoshi, 4,053,697, Cl. 526-142.000.
Shimizu, Tokihiko; Iijima, Yasuo; and Kusano, Makoto, to Matsushita Electric Industrial Co., Ltd. Oil impregnated electric device. 4,053,941, Cl. 361-319.000.
Shimomura, Jun, to Nippon Kogaku K.K. Light-receiving device for use with the exposure meter in single lens reflex camera. 4,053,911, Cl. 354-152.000.
Shinman, Sidney. Device for attachment to a frying pan, cooking pot or like cooking utensil. 4,052,934, Cl. 99-355.000.
Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Nakamoto, Soichi, to Canon Kabushiki Kaisha. Data registering equipment for a camera. 4,053,909, Cl. 354-105.000.
Shinoda, Yoshio; and Kuno, Akira, to Nippon Soken, Inc. Distance meter for vehicle capable of displaying travelling distance to destination. 4,053,749, Cl. 364-424.000.
Shionogi & Co., Ltd.: *See—*
Yoshioka, Mitsuru; Murakami, Masayuki; and Sendo, Yuji, 4,053,469, Cl. 544-21.000.
Shirato, Yoshiaki: *See—*
Hara, Toshitami; Hajimoto, Yoshioki; Shirato, Yoshiaki; and Matsushima, Masaaki, 4,053,209, Cl. 350-160.00R.
Shively, Lawrence A. Apparatus and method for winding armatures. 4,052,783, Cl. 29-597.000.
Showa Denko K. K.: *See—*
Kitayama, Tatsuo; Kusama, Fumihiko; Tomaru, Seigo; and Ebinuma, Akira, 4,053,307, Cl. 75-130.500.
Shuck, David L.: *See—*
Hart, James E.; Shuck, David L.; and Lyon, Ward L., 4,053,559, Cl. 423-261.000.
Shuck, Lowell Z., to United States of America, Energy Research and Development Administration. Portable device and method for determining permeability characteristics of earth formations. 4,052,885, Cl. 73-38.000.
Shuster, Edward J.: *See—*
Schreiber, William L.; Siano, James N.; Vock, Manfred Hugo; and Shuster, Edward J., 4,053,657, Cl. 426-538.000.
Shuster, Esther B.; and Shuster, Jacob. Insect catching device. 4,052,811, Cl. 43-136.000.
Shuster, Jacob: *See—*
Shuster, Esther B.; and Shuster, Jacob, 4,052,811, Cl. 43-136.000.
Shuttleworth, Howard P., to Shuttleworth Inc. Conveyor support. 4,053,039, Cl. 193-35.00R.
Shuttleworth Inc.: *See—*
Shuttleworth, Howard P., 4,053,039, Cl. 193-35.00R.
Siano, James N.: *See—*
Schreiber, William L.; Siano, James N.; Vock, Manfred Hugo; and Shuster, Edward J., 4,053,657, Cl. 426-538.000.
Siden, Dennis Carl; and McMills, Corey John, to Raychem Corporation. Apparatus for the simultaneous termination in terminal sleeves of a plurality of wires with a multi-pin connector. 4,052,778, Cl. 29-749.000.
Siegert, Klaus: *See—*
Zilges, Franz Josef; and Siegert, Klaus, 4,052,877, Cl. 72-253.00A.
Siegmund, Frederik W. Device for changing anode blocks, crust breaking and charging aluminum furnaces. 4,053,384, Cl. 204-244.000.
Siemens Aktiengesellschaft: *See—*
Aidn, Martin; and Wanka, Eberhard, 4,053,858, Cl. 335-276.000.
Beckmann, Oskar, 4,053,894, Cl. 343-225.000.
Bodlaj, Viktor, 4,053,227, Cl. 356-4.000.
Diepers, Heinrich; Schmidt, Otto; and Musebeck, Horst, 4,052,784, Cl. 29-599.000.
Dotzer, Richard; Stoger, Klaus; and Stadter, Josef, 4,053,383, Cl. 204-225.000.
Ernst, Wolfram; Rohrig, Josef; and Renz, Gerhard, 4,053,793, Cl. 307-207.000.
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Glaser, Helmut, 4,053,874, Cl. 340-244.00R.
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Skafvenstedt, Bengt; Ahlgren, Sture; and Tschuertz, Eberhard, 4,053,901, Cl. 346-140.00R.
Skafvenstedt, Bengt; Ahlgren, Sture; and Tschuertz, Eberhard, 4,053,902, Cl. 346-140.00R.
Sierak, Paul F.; and Clough, Allen E., to United States of America, Air Force. Higher-order mode fiber optics T-coupler. 4,053,764, Cl. 250-227.000.
Sieving, Alfred W.: *See—*
Prillinger, Peter F. M.; Rosenberger, Paul C.; and Sieving, Alfred W., 4,052,855, Cl. 60-547.000.
Sigma Scientific Development, Inc.: *See—*
Saliaris, George P., 4,053,135, Cl. 251-10.000.
Silver, H. Graham: *See—*
Scholz, John A.; Gardner, Phillip J.; and Silver, H. Graham, 4,053,805, Cl. 313-229.000.
Simane, Zdenek: *See—*
Schacht, Erich; Mehrhof, Werner; Nowak, Herbert; Simane, Zdenek; and Kayser, Detlev, 4,053,626, Cl. 424-275.000.
Simko, Richard T., to Intel Corporation. Method for forming a narrow gap. 4,053,349, Cl. 156-628.000.
Simmons, Gerald P.; Brubaker, Hiram A.; and Streight, William E., to Caterpillar Tractor Co. Chambered mirror construction for lasers. 4,053,241, Cl. 350-310.000.
Simmons, Walter John; and Willis, Frank Marsden, to Du Pont de Nemours, E. I., and Company. Tampable chub cartridge. 4,052,939, Cl. 102-24.00R.
Simone, John: *See—*
Shaheen, Joseph M.; and Simone, John, 4,052,787, Cl. 29-626.000.

Sims, David L., to United States of America, Air Force. Cylindrical deaerator. 4,053,291, Cl. 55-204.000.

Sims, William B., Jr.: *See—*
Hudspeth, Emmett L.; Richardson, Philip C.; Neathery, John L., Jr.; Dykstra, Jerald P.; Boger, Allen D., Jr.; Sims, William B., Jr.; Hunt, Glenn E.; and Quisenberry, Tony M., 4,053,951, Cl. 364-415.000.

Singer Company, The: *See—*
Papajewski, Reinhold; and Holl, Helmer Heinz, 4,052,947, Cl. 112-158.00R.
Rydz, John Stephen; and Wurst, John Whilldin, 4,052,946, Cl. 112-158.00E.

Singh, Baldev: *See—*
Lesher, George Y.; and Singh, Baldev, 4,053,475, Cl. 260-256.40N.

Sircom, Richard C., to Federal Pacific Electric Company. Ground fault interrupters. 4,053,815, Cl. 361-42.000.

Sisson, Albert E.; and Dorsett, Henry, to Bendix Corporation, The. Pressure limiter means for controlling the operation of a solenoid valve. 4,053,033, Cl. 188-112.000.

Sjoqvist, Erik Ivar: *See—*
Carlsson, Karl-Johan Werner; and Sjoqvist, Erik Ivar, 4,053,947, Cl. 364-200.000.

Skafvenstedt, Bengt; Ahlgren, Sture; and Tschuertz, Eberhard, to Siemens Aktiengesellschaft. Fluid pump for a writing device having an air ejector feature. 4,053,901, Cl. 346-140.00R.

Skafvenstedt, Bengt; Ahlgren, Sture; and Tschuertz, Eberhard, to Siemens Aktiengesellschaft. Fluid pump for a writing device. 4,053,902, Cl. 346-140.00R.

Skipka, Guido: *See—*
Blank, Heinz Ulrich; Durholz, Friedrich; and Skipka, Guido, 4,053,526, Cl. 260-645.000.

Skirde, Gerhard: *See—*
Bachhofer, Bruno; Locher, Anton; Skirde, Gerhard; and Quistorff, Hansjorg, 4,053,403, Cl. 210-62.000.

Skrgatic, Damir Josip Miroslav: *See—*
Brown, Thomas Graham; Skrgatic, Damir Josip Miroslav; Younger, Graeme William; and Fortune, John Cook, 4,052,888, Cl. 73-67.80S.

Slack, Raymond Bender: *See—*
Henricks, Robert Jacobi; Ruckle, Duane Louis; and Slack, Raymond Bender, 4,053,330, Cl. 148-11.50F.

Slater Electric Inc.: *See—*
Doyle, Richard C.; and Meehan, James E., 4,053,198, Cl. 339-103.00R.

Slater, Robert Antony: *See—*
Coates, William John; Roe, Anthony Maitland; Slater, Robert Antony; and Taylor, Edwin Michael, 4,053,601, Cl. 424-250.000.

Slater Steel Industries Limited: *See—*
Houston, Herbert J.; and Bolt, Kenneth D., 4,053,706, Cl. 174-149.00R.

Slote, Lawrence: *See—*
Donnelly, Lawrence A.; Flocke, Leland C.; Himel, Victor H.; Mikals, John J.; Munier, Alfred E.; and Slote, Lawrence, 4,053,399, Cl. 210-44.000.

Slusarenko, John A. Scaffold including reversible and adjustable driving and steering unit. 4,053,025, Cl. 180-2.00R.

Smartt, Herschel B.; and Kovacs, Bela V., to Ford Motor Company. Continuous stream treatment of ductile iron. 4,053,146, Cl. 266-216.000.

Smith, Bruce W., to Lockheed Aircraft Corporation. Stiffened structural laminate and method of molding laminate with stiffener beads. 4,053,667, Cl. 428-36.000.

Smith, Donald J., to Smith-Schreyer & Assoc., Inc. Clamping connector. 4,053,703, Cl. 174-78.000.

Smith, Donald J., to Smith-Schreyer & Assoc., Inc. Plug and kit of parts including same for use in forming a moisture-proof cable splice enclosure. 4,053,704, Cl. 174-87.000.

Smith, Gerald R.: *See—*
Schlain, David; McCawley, Frank X.; and Smith, Gerald R., 4,053,377, Cl. 204-106.000.

Smith, Irvin Darrow; and Seymour, Eugene Wesley, to Abbott Laboratories. Animal growth promotant. 4,053,592, Cl. 424-181.000.

Smith, Ken, to Potter, John Barry. Corner fillets. 4,052,830, Cl. 52-288.000.

Smith Kline & French Laboratories Limited: *See—*
Coates, William John; Roe, Anthony Maitland; Slater, Robert Antony; and Taylor, Edwin Michael, 4,053,601, Cl. 424-250.000.
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,053,473, Cl. 260-250.0BN.

Smith, Leward N. Dredging system and methods of dredging. 4,052,801, Cl. 37-64.000.

Smith-Schreyer & Assoc., Inc.: *See—*
Smith, Donald J., 4,053,703, Cl. 174-78.000.
Smith, Donald J., 4,053,704, Cl. 174-87.000.

SmithKline Corporation: *See—*
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Smiths Industries Limited: *See—*
Dodgson, Roy Howard, 4,052,990, Cl. 128-351.000.

Smyres, Gary A.; Haskett, Philip R.; Scheiner, Bernard J.; and Lindstrom, Roald E., to United States of America, Interior. Recovery of copper and silver from sulfide concentrates. 4,053,305, Cl. 75-104.000.

Snam Progetti S.p.A.: *See—*
Giongo, Matteo; Marconi, Walter; Palladino, Nicola; and Di Gregorio, Francesco, 4,053,521, Cl. 260-618.00H.

Snider, David Eugene. Cordless telephone. 4,053,717, Cl. 179-41.00A.

Snowden, Wesley Raymond, to Oxford Pendaflex Canada Limited. Suspended filing folders. 4,053,057, Cl. 211-126.000.

Sobata, Tamotsu: *See—*
Oka, Shoji; Sobata, Tamotsu; Kishimoto, Teturo; and Nobe, Kazuo, 4,053,328, Cl. 148-6.15Z.

Societe Anonyme D.B.A.: *See—*
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Thioux, Alain, 4,053,031, Cl. 188-71.900.

Societe de vente de l'Aluminium Pechiney: *See—*
Boccon-Gibod, Raymond, 4,053,010, Cl. 164-86.000.

Societe Francaise d'Equipements pour la Navigation Aerienne S.F.E.N.A.: *See—*
Boyer, Francis, 4,053,893, Cl. 343-112.0PT.

Societe Nationale des Poudres et Explosifs: *See—*
Doin, Bernard J.; and Tillac, Jean-Francois, 4,053,119, Cl. 242-107.40R.

Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See—*
Caruel, Jacques Emile Jules; Quillevere, Herve Alain; and Gastebois, Philippe Marc Denis, 4,052,844, Cl. 60-39.650.

Societe Nationale Industrielle Aerospatiale: *See—*
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Mouille, Rene Louis, 4,053,258, Cl. 416-134.00A.

Societe Souriau et Cie: *See—*
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Solomon, Donald F., to Jo-Line Tools, Inc. Reversing ratchet. 4,053,037, Cl. 192-43.100.

Solvay & Cie: *See—*
Martens, Guy, 4,053,529, Cl. 260-653.500.

Somerville, Robert L. Hybrid phosphoric acid process. 4,053,563, Cl. 423-320.000.

Sonicaid Limited: *See—*
Brown, Thomas Graham; Skrgatic, Damir Josip Miroslav; Younger, Graeme William; and Fortune, John Cook, 4,052,888, Cl. 73-67.80S.

Sony Corporation: *See—*
Aozuka, Torao; Ohkoshi, Akio; Muramoto, Shoichi; Nakayama, Akira; and Sumi, Koichiro, 4,053,807, Cl. 313-409.000.
Maruo, Tsunehiro, 4,053,829, Cl. 324-46.000.
Tomita, Shinji; and Kashima, Tsunehiro, 4,052,798, Cl. 35-9.00A.

Soprogespar Societe de Promotion et de Gestion de Participations: *See—*
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Southwire Company: *See—*
Hass, Winfield M.; Niehaus, Howard E.; and Pack, James L., 4,053,059, Cl. 212-18.000.

Sparks, Robert A., to Syntex (U.S.A.) Inc. Method for calibration of an axial tomographic scanner. 4,053,780, Cl. 250-445.00T.

Sperry Rand Corporation: *See—*
Honebrink, Roger Wayne; Johnson, Leslie Harold; and Lo, David Shih-Fang, 4,053,872, Cl. 340-173.0TP.
Rice, Robert L.; and Mast, Aquila D., 4,052,841, Cl. 56-341.000.

Spetner, Norman. Modular furniture. 4,053,192, Cl. 312-107.000.

Spicer, Howard F.: *See—*
Neff, Edward C.; and Spicer, Howard F., 4,053,014, Cl. 165-150.000.

Spicuzza, William F.: *See—*
Moss, Robert H.; and Spicuzza, William F., 4,053,572, Cl. 423-490.000.

Spielberger, Georg: *See—*
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Spivey, Bron Walter, Jr.: *See—*
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Sprague Electric Company: *See—*
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Springbok Appointments (Proprietary) Limited: *See—*
Herr, Peter Erwin, 4,052,872, Cl. 72-62.000.

Stadhouders, Jacobus Josephus: *See—*
Hup, Gerhard; and Stadhouders, Jacobus Josephus, 4,053,642, Cl. 426-36.000.

Stadter, Josef: *See—*
Dotzer, Richard; Stoger, Klaus; and Stadter, Josef, 4,053,383, Cl. 204-225.000.

Stamicarbon, N.V.: *See—*
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Stammreich, John Creighton; and Richter, Robert Dean, to Tridair Industries. Adjustable latch. 4,053,177, Cl. 292-113.000.

Stanadyne, Inc.: *See—*
Salzgeber, Daniel E.; Raufeisen, Robert; and Davis, Charles W., 4,052,971, Cl. 123-139.0AQ.

Standard Oil Company: *See—*
Sheridan, Lee A.; Kovener, Gary S.; Ostrofsky, Bernard; and Nebelsiek, Hilbert J., 4,052,887, Cl. 73-67.80S.

Standard Oil Company (Indiana): *See—*
Edwards, Harold R., Jr., 4,053,681, Cl. 428-431.000.
Fay, Clifford Charles, 4,053,545, Cl. 264-46.400.
Murphy, Robert P.; and Owens, Wiliam W., 4,052,893, Cl. 73-155.000.
Park, Chang-Man; and Micklewright, Donald G., 4,053,506, Cl. 260-525.000.

Standard-Thomson Corporation: *See—*
Wong, Backman; and Wilson, Earl L., 4,053,105, Cl. 236-100.000.

Standardwerk Eugen Reis GmbH: *See—*
Gross, Erwin, 4,052,839, Cl. 53-212.000.
Stapp, Paul R.; and Johnson, Marvin M., to Phillips Petroleum Company. Hydrogenation process and catalyst. 4,053,524, Cl. 260-631.00H.
Stark, Martin H., to Arrow Paper Products Company. Reinforced paperboard can. 4,053,102, Cl. 229-37.00E.
Stauffer Chemical Company: *See—*
Campbell, Ramsey G., 4,053,558, Cl. 423-240.000.
Irani, Mazin R., 4,053,561, Cl. 423-313.000.
Scher, Herbert B., 4,053,627, Cl. 424-278.000.
Stead, George E.: *See—*
Heiba, El-Ahmadi I.; Kinney, Robert E.; and Stead, George E., 4,053,425, Cl. 252-33.000.
Stedman, Robert N., to Caterpillar Tractor Co. Non-articulated scraper arrangement. 4,052,804, Cl. 37-129.000.
Stedman, Robert N., to Caterpillar Tractor Co. Motor grader blade lift and control mechanism and method. 4,053,016, Cl. 172-1.000.
Stedman, Robert N., to Caterpillar Tractor Co. High lift mounting means for loader buckets. 4,053,075, Cl. 214-770.000.
Steele, Richard J. Cutting torch guide. 4,053,145, Cl. 266-58.000.
Steele, William J.: *See—*
Collins, Robert H., III; Steele, William J.; and Thomas, Albert L., Jr., 4,053,929, Cl. 358-126.000.
Steiger, Anton, to Sulzer Brothers Limited. Internal combustion engine for combustion of powdered solid fuel. 4,052,963, Cl. 123-23.000.
Stein, Thomas R.: *See—*
Ireland, Henry R.; and Stein, Thomas R., 4,053,532, Cl. 260-676.00R.
Steinegger, Alfred: *See—*
Moser, Robert; Steinegger, Alfred; Dolder, Fritz; and Feddern, Horst, 4,053,147, Cl. 266-220.000.
Stepe, Visvaldis A.: *See—*
Lanz, William E.; and Stepe, Visvaldis A., 4,052,803, Cl. 37-141.00T.
Stephens, Frank M., Jr., to Hazen Research, Inc. Process for the direct production of steel. 4,053,301, Cl. 75-11.000.
Sterling Drug Inc.: *See—*
Eustis, Frederic A., III; Gorman, William G.; and Nachod, Frederick C., 4,053,636, Cl. 424-326.000.
Lesher, George Y.; and Singh, Baldev, 4,053,475, Cl. 260-256.40N.
Stevens, Donn E., to Bausch & Lomb Incorporated. Support for an ophthalmic instrument. 4,053,213, Cl. 351-38.000.
Stevenson, Curtis A. Snelled hook holder. 4,052,810, Cl. 43-57.50R.
Stevenson, Neil Arthur; and Wardell, George, to Fisons Limited. Composition. 4,053,628, Cl. 424-283.000.
Stewart, Garth David. Hay bale collector. 4,053,064, Cl. 214-6.00B.
Stichting Bedrijven Van Het Nederlands Instituut voor Zuivelonderzoek: *See—*
Hup, Gerhard; and Stadhouders, Jacobus Josephus, 4,053,642, Cl. 426-36.000.
Stickl, Helmut Anton. Attenuated fowl pox virus preparation for the treatment of infectious diseases, method for the manufacture thereof, and its use. 4,053,582, Cl. 424-89.000.
Stilwell, James H.: *See—*
Ryan, Carl R.; and Stilwell, James H., 4,053,837, Cl. 325-323.000.
Stirn, Richard J.: *See—*
United States of America, National Aeronautics and Space Administration; and Stirn, Richard J., 4,053,918, Cl. 357-30.000.
Stix, William. Collecting device for a swimming pool. 4,053,412, Cl. 210-169.000.
Stjernstrom, Nils-Erik: *See—*
Carnmalm, Bernt Sigfrid Emanuel; De Paulis, Tomas; Ross, Svante Bertil; Ramsby, Sten Ingvar; Stjernstrom, Nils-Erik; and Ogren, Sven-Ove, 4,053,632, Cl. 424-316.000.
Carnmalm, Bernt Sigfrid Emanuel; Lindberg, Ulf Henrik Anders; de Paulis, Tomas; Ross, Svante Bertil; Stjernstrom, Nils-Erik; Ulff, Carl Bengt Johan; and Ogren, Sven-Ove, 4,053,637, Cl. 424-330.000.
Stoepel, Kurt: *See—*
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 4,053,614, Cl. 424-266.000.
Stoffelsma, Jan; and Pypker, Jacob, to Polak's Frutal Works B.V.; and Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V. Mercapto alcohols and mercaptoalkyl esters. 4,053,656, Cl. 426-535.000.
Stoger, Klaus: *See—*
Dotzer, Richard; Stoger, Klaus; and Stadter, Josef, 4,053,383, Cl. 204-225.000.
Stoneburner, Donald F.: *See—*
Malmberg, Paul R.; Handy, Robert M.; Stoneburner, Donald F.; and Green, David, 4,053,833, Cl. 324-158.00R.
Story, Charles F.; and Gibson, Donald B., to Champion International Corporation. Method of making composite paper hardboard panel. 4,053,339, Cl. 156-62.200.
Stoy, Artur: *See—*
Jungr, Vaclav; Stoy, Artur; Stoy, Vladimir; and Zima, Jiri, 4,053,442, Cl. 260-29.60R.
Stoy, Vladimir: *See—*
Jungr, Vaclav; Stoy, Artur; Stoy, Vladimir; and Zima, Jiri, 4,053,442, Cl. 260-29.60R.
Straesser, Chris R.: *See—*
Moen, Lowell J.; Helton, Eugene L.; and Straesser, Chris R., 4,052,802, Cl. 37-141.00R.
Strange, Robert F., to Bausch & Lomb Incorporated. Electrographic recorder cover assembly with retractable electrodes. 4,053,899, Cl. 346-68.000.
Strange, Robert F., to Bausch & Lomb Incorporated. Electrographic printer recording medium loading assembly. 4,053,900, Cl. 346-136.000.
Stratis, Melvin A. Preformed one-piece wall covering for a bathtub recess. 4,052,835, Cl. 53-21.0FW.
Straza Enterprises, Ltd.: *See—*
Straza, George Thomas; and Parr, Edward Leon, 4,052,948, Cl. 113-116.00B.
Straza, George Thomas; and Parr, Edward Leon, to Straza Enterprises, Ltd. Method and apparatus for making rectangular corrugated expansion joints. 4,052,948, Cl. 113-116.00B.
Streight, William E.: *See—*
Simmons, Gerald P.; Brubaker, Hiram A.; and Streight, William E., 4,053,241, Cl. 350-310.000.
Strike, Donald P.: *See—*
Kao, Wenling; and Strike, Donald P., 4,053,467, Cl. 260-240.00R.
Strohmeier, Warren: *See—*
Herzl, Peter J.; and Strohmeier, Warren, 4,052,895, Cl. 73-194.0VS.
Stromberg-Carlson Corporation: *See—*
Niertit, Frank; and Rimlinger, Donald C., 4,052,970, Cl. 123-139.0AW.
Struthers Scientific and International Corporation: *See—*
Ganiaris, Neophytos, 4,052,794, Cl. 34-10.000.
Strycker, Stanley J., to Dow Chemical Company, The. Substituted phenoxyalkyl quaternary ammonium compounds as antiarrhythemic agents. 4,053,611, Cl. 424-274.000.
Stuart, Alan: *See—*
Rodgers, Leonard John; and Stuart, Alan, 4,052,847, Cl. 60-262.000.
Sturges, James R.; and Daft, Willis R., to Caterpillar Tractor Co. Side-by-side tractor combination. 4,053,021, Cl. 172-801.000.
Sturtevant, R. L.: *See—*
Harrer, T. S., deceased; Karsay, B. I.; and Sturtevant, R. L., 4,053,573, Cl. 423-540.000.
Suchard, Jean F.: *See—*
Vidalin, Jacques M.; Suchard, Jean F.; and Quang, Hong H., 4,053,871, Cl. 340-146.200.
Suciu, Nick N., IV: *See—*
Vogel, Richard W.; Suciu, Nick N., IV; Glaser, Milton A.; and Szwedo, John A., 4,053,076, Cl. 215-12.00R.
Sudderth, Robert Brantley: *See—*
Clitheroe, Jay B.; and Sudderth, Robert Brantley, 4,053,552, Cl. 423-100.000.
Sugi, Fumio: *See—*
Hattori, Tadashi; Takada, Shigetaka; Sugi, Fumio; and Nakase, Takamichi, 4,052,968, Cl. 123-119.0EC.
Sugisaki, Takao: *See—*
Wasawa, Kiyoshi; Kita, Toru; Sugisaki, Takao; and Higurashi, Minoru, 4,053,826, Cl. 324-34.00D.
Sugita, Tasuku: *See—*
Fukushima, Fumiaki; Sugita, Tasuku; Kobayashi, Kohei; Asada, Hiroshi; and Onishi, Arata, 4,053,401, Cl. 210-52.000.
Sullivan, John E., to California Quartzware Corporation. Low stress semiconductor wafer carrier and method of manufacture. 4,053,294, Cl. 65-56.000.
Sulzer Brothers Limited: *See—*
Steiger, Anton, 4,052,963, Cl. 123-23.000.
Sumi, Koichiro: *See—*
Aozuka, Torao; Ohkoshi, Akio; Muramoto, Shoichi; Nakayama, Akira; and Sumi, Koichiro, 4,053,807, Cl. 313-409.000.
Sumitomo Chemical Company, Limited: *See—*
Asada, Mamoru; Shiga, Akinobu; and Matsuyama, Kiyoshi, 4,053,697, Cl. 526-142.000.
Ono, Isao; Okuno, Yoshitoshi; Nishioka, Toshio; and Itaya, Nobushige, 4,053,625, Cl. 424-274.000.
Sundeen, Joseph E.: *See—*
Hauck, Frederic Peter; Reid, Joyce; Narayanan, Venkatachala L.; Cimarusti, Christopher M.; Haugwitz, Rudiger D.; and Sundeen, Joseph E., 4,053,596, Cl. 424-244.000.
Svacik, Joseph T., to Armour and Company. Preparation of sliced dried beef product. 4,053,649, Cl. 426-266.000.
Swaisgood, Harold E., to Research Triangle Institute. Process of removing the cooked flavor from milk. 4,053,644, Cl. 426-42.000.
Swan Recreational Products Limited: *See—*
Shaw, Frank D., 4,053,758, Cl. 362-158.000.
Swing-Shift Mfg. Co.: *See—*
Aikins, Warren A., 4,053,118, Cl. 242-107.110.
Swiss Aluminium Ltd.: *See—*
Moser, Robert; Steinegger, Alfred; Dolder, Fritz; and Feddern, Horst, 4,053,147, Cl. 266-220.000.
Switzgable, Harold, to Alpha Systems Corporation. Method for producing methane gas by processing waste materials. 4,053,395, Cl. 210-12.000.
Swodenk, Wolfgang: *See—*
Seifert, Hermann; Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,053,523, Cl. 260-621.00G.
Symchowicz, Samson: *See—*
Faro, Hans-Peter; and Symchowicz, Samson, 4,053,509, Cl. 260-557.00R.
Syntex (U.S.A.) Inc.: *See—*
Sparks, Robert A., 4,053,780, Cl. 250-445.00T.
Systron Donner Corporation: *See—*
Bower, Gerald S.; and Voelker, Scott F., 4,053,849, Cl. 331-65.000.

Szwedo, John A.: *See—*
Vogel, Richard W.; Suciu, Nick N., IV; Glaser, Milton A.; and Szwedo, John A., 4,053,076, Cl. 215-12.00R.

Takada, Juichiro, to Takata Kojyo Co., Ltd. Retraction locking safety belt retractor. 4,053,116, Cl. 242-107.700.

Takada, Juichiro, to Takata Kojyo Co., Ltd. Automatic locking safety belt retractor. 4,053,117, Cl. 242-107.40A.

Takada, Shigetaka: *See—*
Hattori, Tadashi; Takada, Shigetaka; Sugi, Fumio; and Nakase, Takamichi, 4,052,968, Cl. 123-119.0EC.

Takagi, Izumi; and Kitai, Haruo, to Kawasaki Heavy Industries, Ltd. V-belt type automatic transmission drive clutch device. 4,052,908, Cl. 74-230.17E.

Takahashi, Akifusa: *See—*
Nakauchi, Shunsaku; and Takahashi, Akifusa, 4,053,939, Cl. 361-171.000.

Takahashi, Nagashige. Illumination light-source device for an endoscope or the like. 4,053,756, Cl. 362-7.000.

Takahashi, Shinkichi: *See—*
Tanaka, Hiroshi; Takahashi, Shinkichi; Takahashi, Touru; Tsukada, Shusei; and Marushima, Giichi, 4,053,770, Cl. 250-324.000.

Takahashi, Susumu: *See—*
Yoshimura, Shoji; Takahashi, Susumu; Ichino, Motonobu; and Nakamura, Tokuro, 4,053,466, Cl. 542-454.000.

Takahashi, Touru: *See—*
Tanaka, Hiroshi; Takahashi, Shinkichi; Takahashi, Touru; Tsukada, Shusei; and Marushima, Giichi, 4,053,770, Cl. 250-324.000.

Takasugi, Tadashi. Fishing bait and method of making same. 4,053,640, Cl. 426-1.000.

Takata Kojyo Co., Ltd.: *See—*
Takada, Juichiro, 4,053,116, Cl. 242-107.700.
Takada, Juichiro, 4,053,117, Cl. 242-107.40A.

Takazawa, Yuzuru: *See—*
Saito, Takeo; Takazawa, Yuzuru; Nagaoka, Shinji; and Seki, Yoichi, 4,053,908, Cl. 354-31.000.

Takeda, Masasi: *See—*
Hosokawa, Akira; Miyazaki, Yukifusa; Yada, Yoshio; Kitamura, Yasuo; and Takeda, Masasi, 4,053,143, Cl. 366-89.000.

Takeda, Tashiro, to Kabushiki Kaisha Komatsu Seisakusho. Automatic control system for earth-moving equipment. 4,053,018, Cl. 172-4.500.

Takei, Haruo: *See—*
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, 4,053,318, Cl. 96-139.000.

Takizawa, Masaaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for preventing surging of a gas turbine. 4,052,843, Cl. 60-39.28R.

Talento, Joseph L.; and Popadick, Carl C., to General Electric Company. Brazed joint between a beryllium-base part and a part primarily of a metal that is retractable with beryllium to form a brittle intermetallic compound. 4,053,728, Cl. 200-267.000.

Tam, Thomas Y. T.: *See—*
Collier, John R.; and Tam, Thomas Y. T., 4,053,270, Cl. 425-144.000.

Tamai, Yoshin: *See—*
Fujita, Yoshiji; Omura, Yoshiaki; Mori, Fumio; Itoi, Kazuo; Nishida, Takashi; Tamai, Yoshin; Aihara, Sukeji; Hosogai, Takeo; and Wada, Fumio, 4,053,380, Cl. 204-163.00R.

Tanabe Seiyaku Co., Ltd.: *See—*
Kawazu, Mitsutaka; Wagatsuma, Mitsuyoshi; Seto, Masahiko; Miyagishima, Toshikazu; Yamaguchi, Totaro; and Ohshima, Satoshi, 4,053,609, Cl. 424-271.000.

Tanaka, Hiroshi; Takahashi, Shinkichi; Takahashi, Touru; Tsukada, Shusei; and Marushima, Giichi, to Canon Kabushiki Kaisha. A.C. corona discharging device. 4,053,770, Cl. 250-324.000.

Tappan Company, The: *See—*
Perl, Richard L., 4,053,136, Cl. 251-11.000.

Tarbox, Edward Albert, to Union Carbide Corporation. Dispensing package. 4,053,055, Cl. 206-554.000.

Tatara, Seiji; Morita, Yasuo; Nishonomiya, Makoto; and Kumoda, Masashi, to Nippon Soda Company, Limited. Safety-calcium hypochlorite composition. 4,053,429, Cl. 252-187.00H.

Tatsumi, Youji, to Kabushiki Kaisha Daini Seikosha. Grinding method and apparatus with metal removal rate control. 4,053,289, Cl. 51-281.00R.

Taylor, Carl A. Self-adjusting spacer for centrifugal pumps. 4,053,255, Cl. 415-127.000.

Taylor, Challen E., to Goodyear Tire & Rubber Company, The. Vulcanization method. 4,053,550, Cl. 264-347.000.

Taylor, Clarence R. Combined golf bag and cart mechanism. 4,053,169, Cl. 280-37.000.

Taylor, Douglas E., to Hoffman, Sidney. Alarm system for warning of unbalance or failure of one or more phases of a multi-phase high-current load. 4,053,876, Cl. 340-253.00H.

Taylor, Edwin Michael: *See—*
Coates, William John; Roe, Anthony Maitland; Slater, Robert Antony; and Taylor, Edwin Michael, 4,053,601, Cl. 424-250.000.

Taylor, George F. Shelling machine. 4,052,992, Cl. 130-30.00H.

Taylor, Lynn J.; and Troy, Neal, to Owens-Illinois, Inc. Recoverable, recyclable, and reusable composite container. 4,053,666, Cl. 428-35.000.

TDK Electronics Co., Ltd.: *See—*
Shiba, Haruo, 4,053,935, Cl. 360-60.000.
Wasawa, Kiyoshi; Kita, Toru; Sugisaki, Takao; and Higurashi, Minoru, 4,053,826, Cl. 324-34.00D.

Teagno, Vladimiro, to AMP Incorporated. Electrical connector. 4,053,197, Cl. 339-99.00R.

Teetz, Wolfgang, to Maschinenfabrik Carl Zangs Aktiengesellschaft. Pattern control mechanism for embroidering machine. 4,052,945, Cl. 112-86.000.

Teichner, Otwald; and Born, Manfred, to Optische Werke G. Rodenstock. Test disk for eye examination. 4,053,212, Cl. 351-32.000.

Teijin Limited: *See—*
Naka, Kiyomi; and Oe, Michisuke, 4,053,317, Cl. 96-115.00P.

Tekken Construction Co. Ltd.: *See—*
Iwamitsu, Yasuyuki; and Kobayashi, Shigeru, 4,052,859, Cl. 61-42.000.

Teldix GmbH: *See—*
Jonner, Wolf-Dieter, 4,053,188, Cl. 303-96.000.

Telefonaktiebolaget L M Ericsson: *See—*
Arras, Juho; Mattsson, Mats Orjan; and Widl, Walter Herbert Erwin, 4,053,723, Cl. 179-175.30R.
Carlsson, Karl-Johan Werner; and Sjoqvist, Erik Ivar, 4,053,947, Cl. 364-200.000.

Telephon- und Telegraphen-Fabriks-Aktiengesellschaft Kapsch & Sohne in Wien: *See—*
Karobath, Ernst; Rippel, Leopold; Pulitzer, Wolfgang; and Schmidinger, Hans, 4,053,273, Cl. 425-357.000.

Tennison, Robert Douglas: *See—*
DeJohn, Patrick Fred; Hoff, Charles Edwin; Tennison, Robert Douglas; and Young, James Clair, Jr., 4,053,752, Cl. 235-302.100.

Tenthorey, Paul Andre: *See—*
Neumeyer, John Leopold; and Tenthorey, Paul Andre, 4,053,603, Cl. 424-258.000.

Teramoto, Iwao: *See—*
Koike, Susumu; Kano, Gota; and Teramoto, Iwao, 4,053,798, Cl. 307-238.000.

Tesk, John A.; Dudek, Ronald P.; and Kosmos, Peter, to Howmedica, Inc. Nonprecious alloy for fusion to porcelain. 4,053,308, Cl. 75-171.000.

Texaco Development Corporation: *See—*
Marquis, Edward T.; and Watts, Lewis W., Jr., 4,053,513, Cl. 260-570.00D.

Texaco Inc.: *See—*
Coleman, Richard L., 4,053,424, Cl. 252-32.70E.
Itria, Oswald A., 4,053,027, Cl. 181-118.000.
Kerr, Edwin R.; Dorawala, Tansukhlal G.; and Reinhard, Russell R., 4,053,531, Cl. 260-672.00R.
Walker, Thad O., 4,053,422, Cl. 252-8.50C.
Woodle, Robert A., 4,053,744, Cl. 364-501.000.

Texas Instruments Deutschland GmbH: *See—*
Heim, Richard, 4,053,096, Cl. 228-4.500.

Texas Instruments Incorporated: *See—*
Cochran, Michael J., 4,053,795, Cl. 307-350.000.
Edwards, Colin Raymond, 4,053,794, Cl. 307-216.000.

Textron, Inc.: *See—*
Lerner, Theodore, 4,053,834, Cl. 325-46.000.
Males, Robert E., 4,053,094, Cl. 227-93.000.

Thiel, Max: *See—*
Hubner, Manfred; Heerdt, Ruth; Schmidt, Felix; and Thiel, Max, 4,053,624, Cl. 424-274.000.

Thillet, Antoine; and Morello, Tomaso. Machine for opening a severed bovine or ovine head. 4,052,769, Cl. 17-23.000.

Thiokol Corporation: *See—*
Crawford, Theodore C., 4,053,566, Cl. 423-386.000.

Thioux, Alain, to Societe Anonyme D.B.A. Piston actuated disc brake with means for pushing the piston. 4,053,031, Cl. 188-71.900.

Thomas, Albert L., Jr.: *See—*
Collins, Robert H., III; Steele, William J.; and Thomas, Albert L., Jr., 4,053,929, Cl. 358-126.000.

Thomson-CSF: *See—*
Baron, Jean-Claude, 4,053,840, Cl. 328-151.000.
Robin, Leon; and Hawkes, Thaddeus, 4,053,888, Cl. 343-13.00R.

Thor Instrument Company, Inc.: *See—*
Thordarson, Petur, 4,052,903, Cl. 73-406.000.

Thordarson, Petur, to Thor Instrument Company, Inc. Pressure sensor. 4,052,903, Cl. 73-406.000.

Thorne, David Edward; and Engel, Kurt, to Beecham Group Limited. Aryloxypyridine for treating hyperglycaemia. 4,053,607, Cl. 424-263.000.

Thorpe, Donald H., to Hooker Chemicals & Plastics Corporation. Process for the preparation of Diels-Alder adducts of halogenated cyclopentadienes. 4,053,528, Cl. 260-648.00C.

Thueringer, Stephen E. Air-actuated stapling gun improvement. 4,053,093, Cl. 227-5.000.

Thun, Floyd A. Dental floss applicator. 4,052,994, Cl. 132-92.00R.

Tiepel, Erich W.; Wu, Christopher K.; and Kitzes, Arnold S., to Westinghouse Electric Corporation. Volume reduction of spent radioactive ion-exchange material. 4,053,432, Cl. 252-301.10W.

Tillac, Jean-Francois: *See—*
Doin, Bernard J.; and Tillac, Jean-Francois, 4,053,119, Cl. 242-107.40R.

Tillinger, Herman Irving; and Walk, Ralph, to Bell Telephone Laboratories, Incorporated. Subharmonic frequency generator. 4,053,822, Cl. 363-172.000.

Tioxide Group Limited: *See—*
Arkless, Kenneth, 4,053,577, Cl. 423-592.000.
Ganderton, William, 4,052,900, Cl. 73-313.000.

Tippetts, Kenneth Boyd: *See—*
Kowalski, John Lawrence; and Tippetts, Kenneth Boyd, 4,053,065, Cl. 214-6.00M.

Tkac, Alexander; and Cvengros, Jan, to Rektorat Slovenskej vysokej skoly technickej. Arrangement for multistage vacuum molecular distilling. 4,053,006, Cl. 159-6.00W.

Tobias, Reginald: *See—*
Brown, David; and Tobias, Reginald, 4,053,085, Cl. 220-378.000.

Tokiwa, Taisuke: *See—*
Hirayama, Kazuhiro; Sato, Yasushi; Tokiwa, Taisuke; Kawakubo, Kazuo; Iwatate, Fujio; and Nakatsui, Hisashi, 4,053,898, Cl. 346-1.000.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Kawamura, Tadashi, 4,053,411, Cl. 210-146.000.
Matsumoto, Mitsuo, 4,053,819, Cl. 318-636.000.

Tol-O-Matic, Inc.: *See—*
Branham, William C.; Garlapaty, Venkat R.; and Berg, David W., 4,053,036, Cl. 192-13.00R.

Tolfsen, Ulf, to Loyo's Indistri A/S. Pillar loop for belts, such as seat belts in cars or the like. 4,052,772, Cl. 24-163.0FC.

Tollinger, James, to Ithaca Gun Company, Inc. Charging handle for a gas-operated shotgun. 4,052,926, Cl. 89-1.00K.

Tolmon, Francis Richard, to Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain & Northern Ireland, The. Axis definition apparatus. 4,053,239, Cl. 356-250.000.

Tomaru, Seigo: *See—*
Kitayama, Tatsuo; Kusama, Fumihiko; Tomaru, Seigo; and Ebinuma, Akira, 4,053,307, Cl. 75-130.500.

Tomecek, Charles J.: *See—*
McCandless, William; Leu, Robert F.; Kroder, Ernest A.; and Tomecek, Charles J., 4,052,821, Cl. 51-53.000.

Tomita, Shinji; and Kashima, Tsunehiro, to Sony Corporation. Audio-visual teaching system. 4,052,798, Cl. 35-9.00A.

Tomita, Yuichi; Irabu, Takeru; and Kiuchi, Eiichi, to Nippon Electric Company, Ltd. Moving target indication radar. 4,053,885, Cl. 343-7.700.

Toray Industries, Inc.: *See—*
Hosokawa, Akira; Miyazaki, Yukifusa; Yada, Yoshio; Kitamura, Yasuo; and Takeda, Masasi, 4,053,143, Cl. 366-89.000.

Torelli, Vesperto: *See—*
Poittevin, Andre; and Torelli, Vesperto, 4,053,618, Cl. 424-270.000.

Torlesse, Arthur Timothy; Bovill, Anthony Wulston; and West, Robert Charles, to Plessey Handel und Investments AG. Method of and apparatus for surveying an area. 4,053,877, Cl. 340-258.00R.

Tosuntikool, Nam; and McGibbon, Gregor D., to GTE Automatic Electric Laboratories Incorporated. Receive amplifier for PAM signals. 4,053,797, Cl. 307-262.000.

Touboul, Jean-Paul: *See—*
Bergez, Pierre; Lacroix, Roger; Plurien, Pierre; and Touboul, Jean-Paul, 4,053,662, Cl. 427-250.000.

Towsley, Frank E., to Dow Chemical Company, The. Cellular metal by electrolysis. 4,053,371, Cl. 204-20.000.

Toyoda, Kenichi: *See—*
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Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
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Takizawa, Masaaki, 4,052,843, Cl. 60-39.28R.

Traut, Earl W. Rolling contact spring bearings. 4,053,191, Cl. 308-206.000.

Travis, Bobby J. Tube bundle extractors for use with heat exchangers. 4,053,062, Cl. 214-1.00P.

Trenne, Myron U.: *See—*
Colling, Ronald L.; Trenne, Myron U.; and Schlax, Timothy R., 4,052,967, Cl. 123-117.00D.

Trense, Ronald V.; Clamen, Allen; and Fernbacher, John M., to Exxon Research & Engineering Co. Control of aerobic biological growth in activated carbon waste water treatment. 4,053,396, Cl. 210-17.000.

Treuner, Uwe D.; and Breuer, Hermann, to E. R. Squibb & Sons, Inc. Pyrazolo[4,3-e][1,2,4]triazolo[4,3-c]pyrimidine. 4,053,474, Cl. 260-256.50R.

Tridair Industries: *See—*
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Coleman, D. Jackson; and Trokel, Stephen L., 4,052,985, Cl. 128-173.00R.

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Troup, Robert L.: *See—*
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Skafvenstedt, Bengt; Ahlgren, Sture; and Tschuertz, Eberhard, 4,053,902, Cl. 346-140.00R.

Tsuda, Masatoshi. Flux for refinement of pro-eutectic silicon crystal grains in high-silicon aluminum alloys. 4,053,304, Cl. 75-257.000.

Tsukada, Shusei: *See—*
Tanaka, Hiroshi; Takahashi, Shinkichi; Takahashi, Touru; Tsukada, Shusei; and Marushima, Giichi, 4,053,770, Cl. 250-324.000.

Tumangday, Fidel G., to Raymond Lee Organization, Inc., The, a part interest. Venipuncture aid device. 4,053,053, Cl. 206-441.000.

Tumavicus, Julius W., to United Technologies Corporation. Variable ratio bypass gas turbine engine with flow diverter valve. 4,052,845, Cl. 60-226.00R.

Turnas, Angelo, to Ring Tool and Die Company. Static free magnetic holding and release means. 4,052,883, Cl. 73-12.000.

Turnbull, Andrew Alfred; and Sewell, Harry, to U.S. Philips Corporation. Pyroelectric detector comprising nucleating material wettable by aqueous solution of pyroelectric material. 4,053,806, Cl. 313-388.000.

Turski, Zygmond; and Mawhinney, Daniel David, to RCA Corporation. Microwave frequency discriminator comprising an FET amplifier. 4,053,842, Cl. 329-103.000.

Tyszewicz, Wieslaw Josef: *See—*
Millette, Louis Guy; Murphy, Peter; Miller, Georges Michel; and Tyszewicz, Wieslaw Josef, 4,053,827, Cl. 324-34.0TK.

Uccello, Salvatore A., to Lok-Rak Corporation of America. Storage rack assembly and mounting clamp therefor. 4,053,246, Cl. 403-233.000.

Uchiyama, Hiromichi; and Hatori, Yukiyoshi, to Nissan Motor Co., Ltd. Current collecting system for self-propelled carriage of aerial tramway. 4,053,035, Cl. 191-45.00A.

Ulff, Carl Bengt Johan: *See—*
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Ullman, Frederick E., to Unarco Industries, Inc. Electrical outlet box assembly. 4,053,082, Cl. 220-3.600.

Unarco Industries, Inc.: *See—*
Ullman, Frederick E., 4,053,082, Cl. 220-3.600.

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United States Bedding Company, The: *See—*
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U.S. Expansion Bolt Company: *See—*
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United States of America
Agriculture: *See—*
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Air Force: *See—*
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Blaha, Franklyn C.; Cricchi, James R.; and White, Marvin H., 4,053,917, Cl. 357-23.000.
Deresh, Bruce A.; and Chevako, Robert J., 4,053,773, Cl. 250-349.000.
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Malagisi, Carmen S., 4,053,895, Cl. 343-700.0MS.
Pinnell, William R.; and Leger, James E., 4,052,894, Cl. 73-189.000.
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Energy Research and Development Administration: *See—*
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Hinterberger, Henry, 4,052,976, Cl. 126-271.000.
Krupke, William F., 4,053,851, Cl. 331-94.50G.
Krupke, William F., 4,053,852, Cl. 331-94.50G.
Pennell, William E., 4,053,358, Cl. 176-50.000.
Pennell, William E.; and Rowan, William J., 4,053,359, Cl. 176-61.000.
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National Aeronautics and Space Administration; administrator; with respect to an invention of:
Schindler, Rudolf A. Interferometer mirror tilt correcting system. 4,053,231, Cl. 356-106.00S.
Stirn, Richard J. High voltage, high current Schottky barrier solar cell. 4,053,918, Cl. 357-30.000.
National Aeronautics and Space Administration: *See*—
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Navy: *See*—
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Elrick, Donald K., 4,052,943, Cl. 102-103.000.
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Orton, Criley; and Bahler, Richard G., 4,053,928, Cl. 358-96.000.
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Woodson, David S., III; and Rudolph, Louis R., 4,053,890, Cl. 343-17.700.
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U.S. Philips Corporation: *See*—
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United Technologies Corporation: *See*—
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Henricks, Robert Jacobi; Ruckle, Duane Louis; and Slack, Raymond Bender, 4,053,330, Cl. 148-11.50F.
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Tumavicus, Julius W., 4,052,845, Cl. 60-226.00R.
University of California, The Regents of the: *See*—
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Egami, Takeshi; and Flanders, Philip J., 4,053,332, Cl. 148-120.000.
Egami, Takeshi; and Flanders, Philip J., 4,053,333, Cl. 148-120.000.
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Lin, Chiu-Hong, 4,053,502, Cl. 560-53.000.
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van de Plassche, Rudy J., to U.S. Philips Corporation. Rectifying circuit. 4,053,796, Cl. 307-261.000.
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Vander Hooven, David I. B.; Van der Zwan, Jacobus Johan; Logston, James L.; and Pennington, Carl E., to Andersons, The. Corn cob processing apparatus and method. 4,053,112, Cl. 241-24.000.
van der Lely, Ary, to C. van der Lely N. V. Cultivator. 4,053,019, Cl. 172-59.000.
van der Lely, Cornelis. Soil working tines. 4,053,020, Cl. 172-713.000.
Van der Zwan, Jacobus Johan: *See*—
Vander Hooven, David I. B.; Van der Zwan, Jacobus Johan; Logston, James L.; and Pennington, Carl E., 4,053,112, Cl. 241-24.000.
Vandor, Robert Joseph, to Mobil Oil Corporation. Method of embossing foam polystyrene to prevent warping upon removal from mold. 4,053,549, Cl. 264-293.000.
Van Etten, Paul, to United States of America, Air Force. Polarization radar method and system. 4,053,882, Cl. 343-5.0SA.
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Veb Schraubenkombinat: *See*—
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Krenzer, John, 4,053,480, Cl. 260-306.80D.
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Velu, Roger G.; Picandet, Jean A.; and Boullier, Francois M., to Jeumont-Schneider. Telephone connector. 4,053,709, Cl. 179-18.0AD.
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Vidalin, Jacques M.; Suchard, Jean F.; and Quang, Hong H., to Agence Nationale de Valorisation de la Recherche (ANVAR). Method and system for the iterative and simultaneous comparison of data with a group of reference data items. 4,053,871, Cl. 340-146.200.
Villamos Berendezes es Keszulek Muvek: *See*—
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Evers, William J.; Heinsohn, Howard H., Jr.; and Vock, Manfred Hugo, 4,053,655, Cl. 426-535.000.
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Vogel, Richard W.; Suciu, Nick N., IV; Glaser, Milton A.; and Szwedo, John A., to Dexter Corporation, The. Coatings for shatterproofing glass bottles. 4,053,076, Cl. 215-12.00R.
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Vorwerk & Co. Elektrowerke GmbH & Co. KG: *See*—
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Vuckovich, Michael, to United States of America, Energy Research and Development Administration. Nuclear reactor remote disconnect control rod coupling indicator. 4,053,355, Cl. 176-19.00R.
Vukelic, Peter. Pedal actuated drive mechanism. 4,052,912, Cl. 74-512.000.

W. E. Healey & Associates, Inc.: *See*—
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Buck, George Sumner, Jr.; Weyker, Robert George; and Ward, Arthur Gerard, 4,053,674, Cl. 428-283.000.
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Wasawa, Kiyoshi; Kita, Toru; Sugisaki, Takao; and Higurashi, Minoru, to TDK Electronics Co., Ltd.; and Nissan Motor Company. Apparatus for detection of rotational angle and number of rotations of a rotary body. 4,053,826, Cl. 324-34.00D.
Wasserman, Bernard; and Kaufman, Martin H., to United States of America, Navy. Process for bonding polymers. 4,053,680, Cl. 428-423.000.
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Weatherby, Robert G.: *See*—
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B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 66,272	4,014,978	Feb. 24, 1976	Mar. 29, 1977
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977
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B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
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B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,344	4,053,067	Feb. 3, 1976	Oct. 11, 1977
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 441,605	4,026,862	Feb. 3, 1976	May 31, 1977
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,228	4,052,954	Feb. 17, 1976	Oct. 11, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485 401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977
B 487,529	4,022,750	Mar. 30, 1976	May 10, 1977
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,711	4,053,467	Mar. 23, 1976	Oct. 11, 1977
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,138	4,034,002	Mar. 23, 1976	July 5, 1977
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 514,839	4,033,816	Mar. 2, 1976	July 5, 1977
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976	B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976	B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976	B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976	B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977	B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976	B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977	B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976	B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976	B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976	B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976	B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977	B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976	B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976	B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976	B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976	B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976	B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977	B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977	B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976	B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977	B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976	B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976	B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976	B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976	B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976	B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976	B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976	B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976	B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976	B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977	B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976	B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976	B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976	B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976	B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976	B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976	B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976	B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977	B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977	B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976	B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976	B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977	B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976	B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976	B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976	B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977	B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977	B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977	B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976	B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977	B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976	B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977	B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976	B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977	B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976	B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977	B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976	B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976	B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976	B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976	B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976	B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976	B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976	B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976	B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976	B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977	B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976	B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976	B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976	B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976	B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977	B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977	B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976	B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976	B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977	B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976	B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976	B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976	B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976	B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976	B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976	B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976	B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976	B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976	B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976	B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976	B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976	B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976	B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976	B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976	B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976	B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976	B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976	B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976	B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976	B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976	B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976	B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976	B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976	B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976	B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976	B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976	B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976	B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977	B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976	B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976	B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976	B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976	B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976	B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976	B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976	B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976	B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977	B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976	B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977	B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976	B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977	B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976	B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976	B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976	B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976	B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977	B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976	B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977	B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977	B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976	B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977	B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977	B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976	B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977	B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976	B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976	B 570,925	4,040,802	Mar. 23, 1976	Aug. 9, 1977
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976	B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976	B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976	B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976	B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976	B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977	B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976	B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976	B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977	B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976	B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976	B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976	B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976	B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976	B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976	B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976	B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976	B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977	B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977	B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977	B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977	B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976	B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977	B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977	B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976	B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976	B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976	B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976	B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976	B 581,564	4,036,653	Mar. 23, 1976	July 19, 1977
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976	B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976	B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977	B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977	B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977	B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976	B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977	B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976	B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976	B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976	B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976	B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976	B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976	B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976	B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976	B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977	B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976	B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977				

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF OCTOBER, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Arenco-KM AB: *See—*
Leander, Leif; and Eriksson, Curt, Re. 29,432, Cl. 17-63.000.

Asea Aktiebolag: *See—*
Bergdahl, Sven Gunnar; and Wangdahl, Torsten, Re. 29,435, Cl. 73-290.00V.

Bergdahl, Sven Gunnar; and Wangdahl, Torsten, to Asea Aktiebolag. Method of supervising the filling level in hoppers, shafts, silos and the like for miscellaneous materials and means for performing the method. Re. 29,435, Cl. 73-290.00V.

Bolliger, Alfred R. Assembly for testing shock absorbers incorporated in a vehicle. Re. 29,434, Cl. 73-11.000.

Bowmar Instrument Corporation: *See—*
Durkee, Gilbert H.; Wareberg, Per G.; and Yoder, Alan C., Re. 29,440, Cl. 200-5.00A.

Calmac Manufacturing Corporation: *See—*
MacCracken, Calvin D.; and Schmidt, Helmut J., Re. 29,438, Cl. 165-46.000.

Canron, Inc.: *See—*
Hurni, Hans, Re. 29,437, Cl. 104-7.00B.

Durkee, Gilbert H.; Wareberg, Per G.; and Yoder, Alan C., to Bowmar Instrument Corporation. Calculator keyboard switch with disc spring contact and printed circuit board. Re. 29,440, Cl. 200-5.00A.

Elektriska Svetsningsaktiebolaget: *See—*
Ericsson, Rolf, Re. 29,441, Cl. 219-135.000.

Ericsson, Rolf, to Elektriska Svetsningsaktiebolaget. Direct current power supply for manual arc welding. Re. 29,441, Cl. 219-135.000.

Eriksson, Curt: *See—*
Leander, Leif; and Eriksson, Curt, Re. 29,432, Cl. 17-63.000.

Ferrero, John: *See—*
Hulle, Robert M.; Ferrero, John; and Pannullo, Gerald, Re. 29,436, Cl. 73-387.000.

Fisons Limited: *See—*
Parsons, John Henry, Re. 29,439, Cl. 260-302.0SD.

Hulle, Robert M.; Ferrero, John; and Pannullo, Gerald, to Trans-Cal Industries, Inc. Encoder for altimeters and the like instruments. Re. 29,436, Cl. 73-387.000.

Hurni, Hans, to Canron, Inc. Device for the vertical and lateral displacement of railway track. Re. 29,437, Cl. 104-7.00B.

Kuroda, Hiroshi: *See—*
Nakajima, Yasuo; Oguri, Takeji; and Kuroda, Hiroshi, Re. 29,433, Cl. 60-290.000.

Leander, Leif; and Eriksson, Curt, to Arenco-KM AB. Method and apparatus for measuring and positioning of fish at head cutting. Re. 29,432, Cl. 17-63.000.

MacCracken, Calvin D.; and Schmidt, Helmut J., to Calmac Manufacturing Corporation. Apparatus for creating and maintaining an ice slab. Re. 29,438, Cl. 165-46.000.

Nakajima, Yasuo; Oguri, Takeji; and Kuroda, Hiroshi, to Nissan Motor Company, Limited. Air-pollution preventive arrangement. Re. 29,433, Cl. 60-290.000.

Nissan Motor Company, Limited: *See—*
Nakajima, Yasuo; Oguri, Takeji; and Kuroda, Hiroshi, Re. 29,433, Cl. 60-290.000.

Oguri, Takeji: *See—*
Nakajima, Yasuo; Oguri, Takeji; and Kuroda, Hiroshi, Re. 29,433, Cl. 60-290.000.

Pannullo, Gerald: *See—*
Hulle, Robert M.; Ferrero, John; and Pannullo, Gerald, Re. 29,436, Cl. 73-387.000.

Parsons, John Henry, to Fisons Limited. Certain 1,2,4-Oxa- and -thiadiazol-5-ylthioalkanoic acid derivatives. Re. 29,439, Cl. 260-302.0SD.

Schmidt, Helmut J.: *See—*
MacCracken, Calvin D.; and Schmidt, Helmut J., Re. 29,438, Cl. 165-46.000.

Trans-Cal Industries, Inc.: *See—*
Hulle, Robert M.; Ferrero, John; and Pannullo, Gerald, Re. 29,436, Cl. 73-387.000.

Wangdahl, Torsten: *See—*
Bergdahl, Sven Gunnar; and Wangdahl, Torsten, Re. 29,435, Cl. 73-290.00V.

Wareberg, Per G.: *See—*
Durkee, Gilbert H.; Wareberg, Per G.; and Yoder, Alan C., Re. 29,440, Cl. 200-5.00A.

Yoder, Alan C.: *See—*
Durkee, Gilbert H.; Wareberg, Per G.; and Yoder, Alan C., Re. 29,440, Cl. 200-5.00A.

LIST OF PLANT PATENTEES

Duffett, William E.: *See—*
Jessel, Walter H., Jr.; and Duffett, William E., 4,122, Cl. 79.000.
Jessel, Walter H., Jr.; and Duffett, William E., 4,123, Cl. 77.000.

Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,122, 10-11-77, Cl. 79.000.

Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,123, 10-11-77, Cl. 77.000.

Mikkelsens Inc.: *See—*
Rohde, Hans-Joachim, 4,124, Cl. 68.000.
Rohde, Hans Joachim, 4,125, Cl. 68.000.

Pan-American Plant Company: *See—*
Shoesmith, Leonard H., 4,126, Cl. 74.000.

Rohde, Hans-Joachim, to Mikkelsens Inc. Begonia plant. 4,124, 10-11-77, Cl. 68.000.

Rohde, Hans Joachim, to Mikkelsens Inc. Begonia plant. 4,125, 10-11-77, Cl. 68.000.

Shoesmith, Leonard H., to Pan-American Plant Company. Chrysanthemum named Lexington. 4,126, 10-11-77, Cl. 74.000.

Yoder Brothers, Inc.: *See—*
Jessel, Walter H., Jr.; and Duffett, William E., 4,122, Cl. 79.000.
Jessel, Walter H., Jr.; and Duffett, William E., 4,123, Cl. 77.000.

LIST OF DESIGN PATENTEES

A-Betong AB: *See—*
Thim, Stig; and Ahlquist, Claes, 246,056, Cl. D25-73.000.

Ahlquist, Claes: *See—*
Thim, Stig; and Ahlquist, Claes, 246,056, Cl. D25-73.000.

American Sterilizer Company: *See—*
Jackson, Frank W., 246,072, Cl. D87-3.00A.

Ball Corporation: *See—*
Stahel, Alvin J., 246,026, Cl. D7-130.000.

Bartz, Richard O. Soil working hand tool. 246,027, 10-11-77, Cl. D8-11.000.

Bedel, Denis E., to Westinghouse Electric Corporation. Font of characters. 246,069, 10-11-77, Cl. D64-12.00B.

Bellini, Mario, to Nippon Gakki Seizo Kabushiki Kaisha. Cassette-deck. 246,041, 10-11-77, Cl. D14-6.000.

Bianchi, John E. Racket frame. 246,061, 10-11-77, Cl. D34-5.0ST.

Bissonnette, Albert E. Appliance for exercizing the teeth and gums. 246,054, 10-11-77, Cl. D24-36.000.

Brady, Joseph Daniel. Reading stand or the like. 246,016, 10-11-77, Cl. D6-25.000.

Brio Toy AB: *See—*
Hagland-Ahrnborg, Kerstin Margaretha, 246,063, Cl. D34-15.00C.

Brown, Richard E.: *See—*
Morris, Alvin F.; and Brown, Richard E., 246,013, Cl. D2-400.000.

Burgess, Kenneth Peter; and Elsdale, Timothy Sefton, to WCB Containers Limited. Pool. 246,058, 10-11-77, Cl. D34-5.00F.

Cal-Mar Industries, Inc.: *See*—
Maresca, Edward J., 246,057, Cl. D25-91.000.

Concept, Inc.: *See*—
Staub, David E.; and Troutner, Vernon H., 246,053, Cl. D24-26.000.

Conrad, Kenneth H., to Poly Medical Systems, Inc. Tennis ball holder. 246,014, 10-11-77, Cl. D2-400.000.

Cridland, Michael: *See*—
Pulos, Arthur J.; Cridland, Michael; and Moro, Joseph, 246,039, Cl. D14-3.000.

Daiwa Seiko, Inc.: *See*—
Nakamura, Hideo, 246,049, Cl. D22-26.000.

Damman, Lee J. Wall calendar. 246,048, 10-11-77, Cl. D19-25.000.

DASA Corporation: *See*—
Fossella, Gregory F.; and Rhoads, Peter K., 246,042, Cl. D14-53.000.

Dictaphone Corporation: *See*—
Pulos, Arthur J.; Cridland, Michael; and Moro, Joseph, 246,039, Cl. D14-3.000.

Dimensionetix, Inc.: *See*—
Gruber, George S., 246,051, Cl. D23-59.000.

Discojet Corporation: *See*—
Moller, Paul S., 246,038, Cl. D12-194.000.

Eckman, Harold. Protector for male genitals. 246,011, 10-11-77, Cl. D2-1.000.

Elsdale, Timothy Sefton: *See*—
Burgess, Kenneth Peter; and Elsdale, Timothy Sefton, 246,058, Cl. D34-5.00F.

Fossella, Gregory F.; and Rhoads, Peter K., to DASA Corporation. Automatic telephone dialer. 246,042, 10-11-77, Cl. D14-53.000.

Gaines, Marjorie Ann. Wall mounted holder for bottles or the like. 246,020, 10-11-77, Cl. D6-86.000.

Garasi, Louis A., to Pinta's Cultured Marble Inc. Vanity bowl. 246,050, 10-11-77, Cl. D23-58.000.

Glesius, Frederick L.: *See*—
Kroon, John C.; and Glesius, Frederick L., 246,031, Cl. D10-56.000.

Gooden, Robert K., to Grandinetti Products, Inc. Electric crepe pan. 246,025, 10-11-77, Cl. D7-87.000.

Grandinetti Products, Inc.: *See*—
Gooden, Robert K., 246,025, Cl. D7-87.000.

Gruber, George S., to Dimensionetix, Inc. Combined vanity bowl and stand. 246,051, 10-11-77, Cl. D23-59.000.

Hagland-Ahrnborg, Kerstin Margaretha, to Brio Toy AB. Audible toy. 246,063, 10-11-77, Cl. D34-15.00C.

Hantke, William E. Coaster. 246,024, 10-11-77, Cl. D7-45.000.

Hatai, Yoshiaki, to Taisho Pharmaceutical Co., Ltd. Fumigator. 246,052, 10-11-77, Cl. D23-150.000.

Hawthorne, Allen Dana, to International Business Machines Corporation. Electrophotographic apparatus or similar article. 246,046, 10-11-77, Cl. D16-30.000.

Hero, Franz; and Odermatt, Karl, to Interlubke Gebr.Lubke KG. Combined bed, shelf and cabinet unit. 246,018, 10-11-77, Cl. D6-80.000.

Hero, Franz; and Odermatt, Karl, to Interlubke Gebr.Lubke KG. Combined bed and headboard unit. 246,019, 10-11-77, Cl. D6-80.000.

Hillman, Douglas C.; and Solomon, Herbert J., to Uniroyal, Inc. Footwear display system. 246,023, 10-11-77, Cl. D6-189.000.

Hoshino, Kunio, to Matsushita Electric Industrial Co., Ltd. Combined tape recorder, tuner and amplifier. 246,040, 10-11-77, Cl. D14-5.000.

Interlubke Gebr.Lubke KG: *See*—
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Hero, Franz; and Odermatt, Karl, 246,019, Cl. D6-80.000.

International Business Machines Corporation: *See*—
Hawthorne, Allen Dana, 246,046, Cl. D16-30.000.

Jackson, Frank W., to American Sterilizer Company. Combined medication and instruction card carrier case. 246,072, 10-11-77, Cl. D87-3.00A.

K-tel International, Inc.: *See*—
Koblick, Jeffrey M., 246,064, Cl. D34-15.00V.

Kato, Taketoshi. Display device for use with colored flicker plates. 246,075, 10-11-77, Cl. D96-12.00R.

Kelly, Jerry Robert. Overhead console for automobiles and trucks. 246,037, 10-11-77, Cl. D12-155.000.

Kies, Jared R., to Owens-Corning Fiberglas Corporation. Embossed plastic sheet material. 246,073, 10-11-77, Cl. D87-3.00G.

Kies, Jared R., to Owens-Corning Fiberglas Corporation. Embossed plastic sheet material. 246,074, 10-11-77, Cl. D87-3.00G.

King, Dale E. Teaching protractor. 246,033, 10-11-77, Cl. D10-65.000.

Koblick, Jeffrey M., to K-tel International, Inc. Toy building block mold. 246,064, 10-11-77, Cl. D34-15.00V.

Kowalski, Robert R. Playing card holder. 246,062, 10-11-77, Cl. D34-13.00A.

Kranso Manufacturing, Inc.: *See*—
O'Farrell, Kevin J., 246,066, Cl. D34-42.000.

Kroon, John C.; and Glesius, Frederick L., to Reuter-Stokes, Inc. Heat stress monitor. 246,031, 10-11-77, Cl. D10-56.000.

Landell, Harper; and Souza, Anthony J., to Woodstream Corporation. Tackle box. 246,071, 10-11-77, Cl. D87-1.00R.

Lynn, Elmer C.; and Slaughter, Leonard, Jr., to Robb Container Corporation. Packaging container or the like. 246,029, 10-11-77, Cl. D9-216.000.

Machos, Carroll Stanley. Protective cover for an animal carcass. 246,070, 10-11-77, Cl. D87-1.00R.

Malish, Jim E. Game target. 246,059, 10-11-77, Cl. D34-5.0PP.

Maresca, Edward J., to Cal-Mar Industries, Inc. Translucent inter-locking panel member for ceilings or the like. 246,057, 10-11-77, Cl. D25-91.000.

Mathur, Florence M. Table. 246,022, 10-11-77, Cl. D6-146.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Hoshino, Kunio, 246,040, Cl. D14-5.000.

McCain, Lawrence Glen; and Scott, Edward William, to Rockwell International Corporation. Electronic calculator. 246,068, 10-11-77, Cl. D64-11.00B.

McLeod, Allan L. Digital thermometer. 246,032, 10-11-77, Cl. D10-57.000.

McNab, Donald W., to W. Braun Company. Bottle. 246,028, 10-11-77, Cl. D9-158.000.

Mills, Kenneth Wilson. Self supporting disposable bed pan. 246,055, 10-11-77, Cl. D24-57.000.

Minette, Kalevi. Face guard attachment for a helmet. 246,012, 10-11-77, Cl. D2-233.000.

Moller, Paul S., to Discojet Corporation. Combined muffler and spark arrestor. 246,038, 10-11-77, Cl. D12-194.000.

Moro, Joseph: *See*—
Pulos, Arthur J.; Cridland, Michael; and Moro, Joseph, 246,039, Cl. D14-3.000.

Morris, Alvin F.; and Brown, Richard E. Holder for a flagstaff or the like. 246,013, 10-11-77, Cl. D2-400.000.

Motorola, Inc.: *See*—
Taylor, Terrance Nelson, 246,043, Cl. D14-53.000.

Murphy, William Cook, to Murphy, William Cook. Playground climber or similar articles. 246,060, 10-11-77, Cl. D34-5.00H.

Nakamura, Hideo, to Daiwa Seiko, Inc. Combined fishing reel and fishing rod grip. 246,049, 10-11-77, Cl. D22-26.000.

Nash, Stanley P., to Schweiger Industries, Inc. Seat. 246,017, 10-11-77, Cl. D6-63.000.

Nippon Gakki Seizo Kabushiki Kaisha: *See*—
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Odermatt, Karl: *See*—
Hero, Franz; and Odermatt, Karl, 246,018, Cl. D6-80.000.
Hero, Franz; and Odermatt, Karl, 246,019, Cl. D6-80.000.

O'Farrell, Kevin J., to Kranso Manufacturing, Inc. Kick board. 246,066, 10-11-77, Cl. D34-42.000.

Owens-Corning Fiberglas Corporation: *See*—
Kies, Jared R., 246,073, Cl. D87-3.00G.
Kies, Jared R., 246,074, Cl. D87-3.00G.

Pinta's Cultured Marble Inc.: *See*—
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Reuter-Stokes, Inc.: *See*—
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Rhoads, Peter K.: *See*—
Fossella, Gregory F.; and Rhoads, Peter K., 246,042, Cl. D14-53.000.

Richards, Theodore W. Combined liquid dispenser holder and toilet paper roll holders. 246,021, 10-11-77, Cl. D6-91.000.

Robb Container Corporation: *See*—
Lynn, Elmer C.; and Slaughter, Leonard, Jr., 246,029, Cl. D9-216.000.

Rockwell International Corporation: *See*—
McCain, Lawrence Glen; and Scott, Edward William, 246,068, Cl. D64-11.00B.

Rudiger, Rudolf. Sailboat. 246,035, 10-11-77, Cl. D12-64.000.

Saul, Edward L. Skate board. 246,065, 10-11-77, Cl. D34-15.0AJ.

Schweiger Industries, Inc.: *See*—
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Scott, Edward William: *See*—
McCain, Lawrence Glen; and Scott, Edward William, 246,068, Cl. D64-11.00B.

Sexton, Edward W.; and Sexton, Edward W., Jr. Can or similar article. 246,030, 10-11-77, Cl. D9-218.000.

Sexton, Edward W., Jr.: *See*—
Sexton, Edward W.; and Sexton, Edward W., Jr., 246,030, Cl. D9-218.000.

Slaughter, Leonard, Jr.: *See*—
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Solomon, Herbert J.: *See*—
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Landell, Harper; and Souza, Anthony J., 246,071, Cl. D87-1.00R.

Sparks, Walton E.; and Weiss, Richard K., to Westinghouse Electric Corporation. Security console. 246,034, 10-11-77, Cl. D10-106.000.

Stahel, Alvin J., to Ball Corporation. Storage bowl lettuce support or like article. 246,026, 10-11-77, Cl. D7-130.000.

Staub, David E.; and Troutner, Vernon H., to Concept, Inc. Monopolar electrosurgical device with hand switch. 246,053, 10-11-77, Cl. D24-26.000.

Sulek, Eugene Joseph, to Texas Instruments Incorporated. Calculator casing. 246,067, 10-11-77, Cl. D64-11.00B.

Susich, Roland J. Radio. 246,044, 10-11-77, Cl. D14-69.000.

Suzuki, Sakuta, to UNIC Corporation. Viewing glass for microfilm. 246,045, 10-11-77, Cl. D16-11.000.

Taisho Pharmaceutical Co., Ltd.: *See*—
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Thim, Stig; and Ahlquist, Claes, to A-Betong AB. Concrete sleeper block. 246,056, 10-11-77, Cl. D25-73.000.
Thomas, Morton I. Folding walker. 246,036, 10-11-77, Cl. D12-130.000.
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Westinghouse Electric Corporation: *See*—
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Sparks, Walton E.; and Weiss, Richard K., 246,034, Cl. D10-106.000.
Woodstream Corporation: *See*—
Landell, Harper; and Souza, Anthony J., 246,071, Cl. D87-1.00R.
Zalman, Alexander. Illuminated table magnifier. 246,047, 10-11-77, Cl. D16-55.000.

CLASSIFICATION OF PATENTS

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